RING SPINNING FRAMES MODEL "A"

H & B AMERICAN MACHINE COMPANY
PAWTUCKET, R. I.

SPECIAL
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1900z

RING SPINNING FRAMES

MODEL "A"

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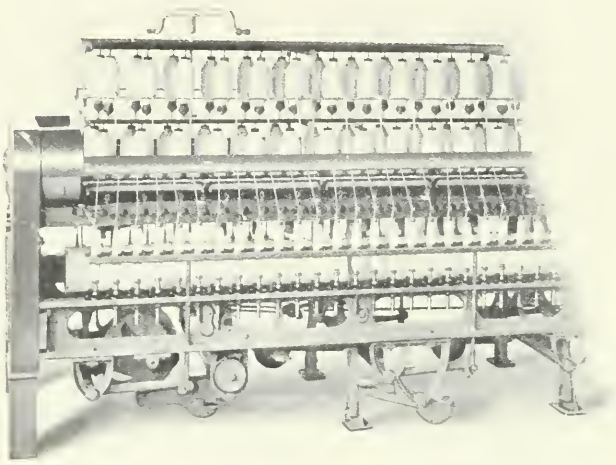
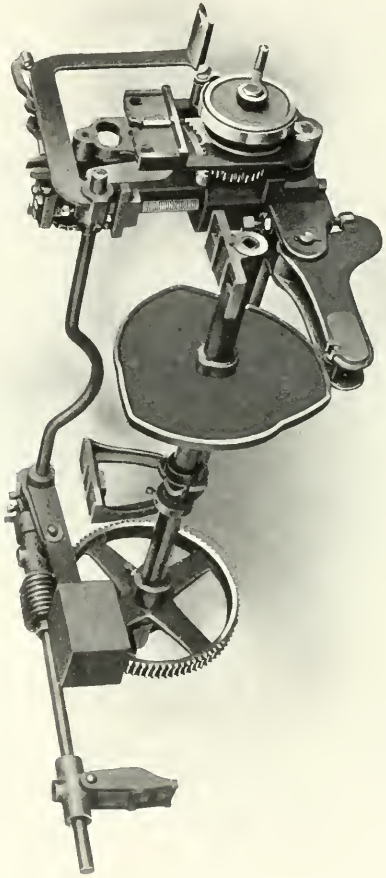
PAWTUCKET, R. I.



HEAD OR GEARING END OF SPINNING FRAME

RING SPINNING FRAMES
MODEL "A"

UMass Dartmouth



BUILDER FOR RING SPINNING FRAME

IMPROVED BUILDER.

When designing our improved Spinning Frame Builder, special attention was given to obtaining a wide range in form and build of bobbin combined with simplicity and durability. The changes necessary when altering the wind, pick or traverse have been reduced to a minimum.

The Builder is a combination type, and the change from warp to filling, or vice versa, can be easily and quickly made.

The illustration shows a filling cam only on the cam shaft, but when warp and filling wind are wanted, two cams are placed on this shaft.

The length of the traverse is determined by the adjustable Wave Shaft Stud, which can be easily and quickly raised or lowered, and the Ring Rail can be placed at the correct starting point by means of a thumb nut.

The Pick or Take-up Motion is very simple. The pawl is on a plate which has a gear at the back. This gear is driven by a Quadrant which is connected to the top of the Builder. The pawl shield is set so that any required number of teeth can be taken up and no change gears are used.

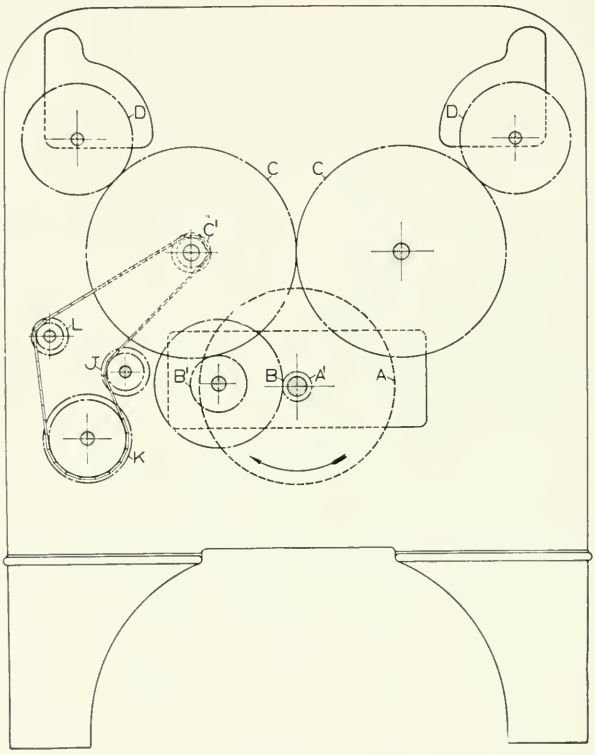
In the Builder Arm is an adjusting screw, which is used with warp wind to regulate the taper on the bobbin. The taper can be decreased at the bottom and increased at the top by turning in this screw.

When the foot lever is pressed, it throws the Worm out of gear and allows the rail to be dropped. After winding back the Pick Motion, the Frame is ready for doffing and starting a new set.

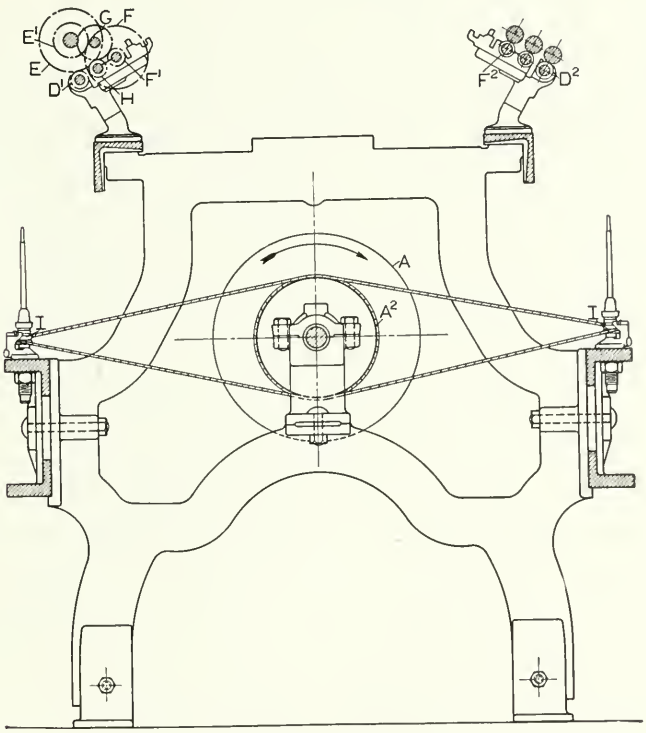
An eccentric device is applied to enable the "Socket Doff" to be used when desired.

The Worm Gear Shaft is driven by a sprocket chain in the head end. The speed of this shaft and consequently the speed of the traverse is increased or decreased by changing the Sprocket Gear.

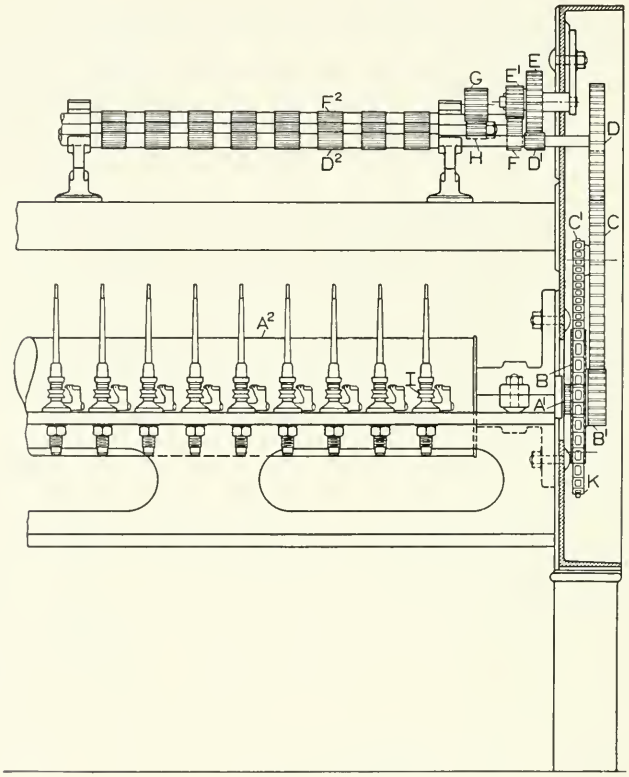
The bevel gears are well protected from dust and fly by a cover, and the Builder screw itself is provided with a cleaner which prevents the collection of dirt in the threads.



HEAD END GEARING
RING SPINNING FRAME



SECTIONAL VIEW
RING SPINNING FRAME



SIDE VIEW
RING SPINNING FRAME

SPINNING FRAME.

ALPHABETICAL REFERENCES TO DRAWINGS.

A Driving Pulley, 8 in. to 18 in. dia., advancing by ½ in. increments ; 3¼ in. face.

A¹ Cylinder Gear, 17, 21, 29 and 39 T.

A² Cylinder, 7 in. dia.

B Jack Gear, 72, 76, 86, 96 and 106 T.

B¹ Twist Change Gear, 25—67 T., advancing by one tooth.

C Intermediate Gear, 156 T. for 36-in. frame ; 171 T. for 39 in. frame.

C¹ Builder Motion Driving Sprocket Gear, 8 T.

D Front Roll Twist Gear, 84 T.

D¹ Front Roll Draft Gear, 21 and 27 T.

D² Front Roll, usually 1 in. dia.; sometimes $1\frac{1}{16}$ in. dia. and 1⅛ in. dia.

E Crown Gear, 72, 90 and 108 T.

E¹ Draft Change Gear, 32—59 T., advancing by one tooth.

F Large Back Roll Gear, 79 and 89 T.

F¹ Small Back Roll Gear, 28 T. for ⅞ in. dia. Middle and Back Rolls, 29 T. for $1\frac{5}{16}$ in. dia. Middle Roll, $1\frac{1}{16}$ in. dia. Back Rolls.

F² Back Roll, usually ⅞ in. dia., sometimes $1\frac{1}{16}$ in. dia. and 1⅛ in. dia.

G Broad Middle Roll Intermediate Gear, 48 T.

H Middle Roll Gear, 26 T. for ⅞ in. dia. Middle and Back Rolls, 24 T. for $1\frac{5}{16}$ in. dia. Middle and $1\frac{1}{16}$ in. dia. Back Rolls.

I Whorl, ¾ in., $1\frac{3}{16}$ in. and ⅞ in. dia.

J Carrier Sprocket Gear, 10 T.

K Builder Motion Worm Shaft Sprocket Gear, 12, 14, 16, 18, 20, 22 and 24 T., dependent upon the Number of Yarn.

L Carrier Sprocket Gear, 7 T.

SPINNING FRAMES.

DRAFT CALCULATIONS

Rules:

$$\frac{\text{F x E x dia. of Front Roll}}{\text{D}^1 \text{ x dia. of Back Roll}} = \text{Draft Constant.}$$

$$\frac{\text{Draft Constant}}{\text{Draft Change Gear (E}^1\text{)}} = \text{Draft.}$$

$$\frac{\text{Draft Constant}}{\text{Draft required}} = \text{Draft Change Gear (E}^1\text{).}$$

Examples:

If Front Roll Gear (D^1) = 27 T. Back Roll Gear (F) = 89 T, Crown Gear (E) = 72 T. Front Roll, 1 inch dia. Back Roll, ⅞ inch dia.

$$\frac{89 \times 72 \times 1}{27 \times \frac{7}{8}} = 271.24 = \text{Draft Constant.}$$

If Draft Change Gear (E^1) = 34 T.

$$\frac{271.24}{34} = 7.98 = \text{Draft.}$$

If Draft required = 6.00

$$\frac{271.24}{6.00} = 45 \text{ T.} = \text{Draft Change Gear (E}^1\text{).}$$

TWIST CALCULATIONS.

Rules:

$$\frac{\text{D x B x Ratio of Whirl Speed to Cylinder Speed}}{\text{A}^1 \text{ x Circum. of Front Roll}} = \text{Twist Constant.}$$

$$\frac{\text{Twist Constant}}{\text{Twist Change Gear (B}^1\text{)}} = \text{Twist per inch.}$$

$$\frac{\text{Twist Constant}}{\text{Twist per inch required}} = \text{Twist Change Gear (B}^1\text{).}$$

When figuring the Ratio of Whirl Speed to Cylinder Speed we add ⅛ inch to the diameters to allow for the band.

Examples:

If Cylinder Gear (A^1) = 21 T, Jack Gear (B) = 96 T, Front Roll Gear (D) = 84 T. Cylinder, 7 inch dia. Whirl, ¾ inch dia. Ratio of Whirl Speed to Cylinder Speed = 8.143. Front Roll, 1 inch dia.

$$\frac{84 \times 96 \times 8.143}{21 \times 3.1416} = 995.31 = \text{Twist Constant}$$

If Twist Change Gear (B^1) = 40 T.

$$\frac{995.31}{40} = 24.88 \text{ Turns Twist per inch.}$$

If Twist per inch required = 18.10.

$$\frac{995.31}{18.10} = 55 \text{ T} = \text{Twist Change Gear } (B^1).$$

PRODUCTION CALCULATIONS

Rule:

$$\frac{\text{R.P.M. of Front Roll} \times \text{Circum. of Front Roll} \times 3600 \text{ (min. in 60 hours)}}{36 \text{ (inches in 1 yd.)} \times 840 \text{ (yds. in 1 hank)} \times \text{No. of Yarn}} = \text{Lbs. Production per Spindle in 60 hours.}$$

Example:

If No. 20 Warp Yarn, 134.0 R. P. M. of Front Roll, Circum. of 1 inch Front Roll = 3.1416 inches. 10 per cent. allowance for stops, etc.

$$\frac{134.0 \times 3.1416 \times 3600 \times .90}{36 \times 840 \times 20} = 2.26 \text{ lbs. in 60 hours.}$$

RING SPINNING FRAME, DRAFT TABLE.

FRONT ROLL 1 IN. DIAM. BACK ROLL ⅞ IN. DIAM.

Front Roll Gear	27	27	27	21	27	21	21
Back Roll Gear	89	79	89	89	89	89	89
Crown Gear	72	90	90	72	108	90	108
Draft Constant	271.24	300.95	339.05	348.73	406.86	435.92	523.10
Draft Gear	Draft	Draft	Draft	Draft	Draft	Draft	Draft
32	8.48	9.40	10.60	10.89	12.71	13.62	16.35
33	8.22	9.12	10.27	10.57	12.33	13.21	15.85
34	7.98	8.85	9.97	10.26	11.97	12.82	15.39
35	7.75	8.60	9.69	9.96	11.62	12.46	14.95
36	7.42	8.36	9.42	9.69	11.30	12.11	14.53
37	7.33	8.13	9.16	9.43	11.00	11.78	14.14
38	7.14	7.92	8.92	9.18	10.71	11.47	13.77
39	6.95	7.72	8.69	8.94	10.43	11.18	13.41
40	6.78	7.52	8.48	8.72	10.17	10.90	13.08
41	6.62	7.34	8.27	8.51	9.92	10.63	12.76
42	6.46	7.17	8.07	8.30	9.69	10.38	12.46
43	6.31	7.00	7.88	8.11	9.46	10.14	12.17
44	6.16	6.84	7.70	7.93	9.25	9.91	11.88
45	6.03	6.69	7.53	7.75	9.04	9.69	11.62
46	5.90	6.54	7.37	7.58	8.84	9.48	11.37
47	5.77	6.40	7.21	7.42	8.66	9.27	11.13
48	5.65	6.27	7.06	7.27	8.48	9.08	10.90
49	5.54	6.14	6.92	7.12	8.30	8.90	10.68
50	5.42	6.02	6.78	6.97	8.14	8.72	10.46
51	5.32	5.90	6.65	6.84	7.98	8.55	10.26
52	5.22	5.79	6.52	6.76	7.82	8.38	10.06
53	5.12	5.68	6.40	6.58	7.68	8.22	9.87
54	5.02	5.57	6.28	6.46	7.53	8.07	9.69
55	4.93	5.47	6.16	6.32	7.40	7.93	9.51
56	4.84	5.37	6.05	6.23	7.27	7.78	9.34
57	4.76	5.28	5.95	6.12	7.14	7.65	9.18
58	4.68	5.19	5.85	6.01	7.01	7.52	9.02
59	4.60	5.10	5.75	5.91	6.90	7.39	8.87

RING SPINNING FRAME, DRAFT TABLE.

FRONT AND BACK ROLLS SAME DIAMETER.

Front Roll Gear	27	27	27	21	27	21	21
Back Roll Gear	89	79	89	89	89	89	89
Crown Gear	72	90	90	72	108	90	108
Draft Constant	237.33	263.33	296.67	305.14	356.00	381.43	457.71
Draft Gear	Draft	Draft	Draft	Draft	Draft	Draft	Draft
32	7.42	8.23	9.27	9.54	11.13	11.92	14.30
33	7.19	7.98	8.99	9.25	10.79	11.56	13.87
34	6.98	7 75	8.73	8.97	10.47	11.22	13.46
35	6.78	7.52	8.48	8.72	10.17	10.90	13.08
36	6.59	7.31	8.24	8.48	9.89	10.60	12.71
37	6.41	7.12	8.02	8.25	9.62	10.31	12.37
38	6.25	6.93	7.81	8.03	9.37	10.04	12.05
39	6.09	6.75	7.61	7.82	9.13	9.78	11.74
40	5.93	6.58	7.42	7.63	8.90	9.54	11.44
41	5.79	6.42	7.24	7.44	8.68	9.30	11.16
42	5.65	6.27	7.06	7.27	8.48	9.08	10.90
43	5.52	6.12	6.90	7.10	8.28	8.87	10.64
44	5.39	5.98	6.74	6.94	8.09	8.67	10.40
45	5.27	5.85	6.59	6.78	7.91	8.48	10.17
46	5.16	5.72	6.45	6.63	7.74	8.29	9.95
47	5.05	5.60	6.31	6.49	7.57	8.12	9.74
48	4.94	5.49	6.18	6.36	7.42	7.94	9.54
49	4.84	5.37	6.05	6.23	7.27	7.78	9.34
50	4.75	5.27	5.93	6.10	7.12	7.63	9.15
51	4.65	5.16	5.82	5.98	6.98	7.48	8.97
52	4.56	5.06	5.71	5.86	6.85	7.34	8.80
53	4.48	4.97	5.60	5.75	6.72	7.20	8.64
54	4.40	4.88	5.49	5.65	6.59	7.06	8.48
55	4.32	4.79	5.39	5.55	6.47	6.94	8.32
56	4.24	4.70	5.30	5.45	6.36	6.81	8.17
57	4.16	4.62	5.20	5.36	6.25	6.69	8.03
58	4.09	4.54	5.11	5.26	6.14	6.58	7.89
59	4.02	4.46	5.03	5.17	6.03	6.45	7.76

BAND DRIVEN

RING SPINNING FRAME, TWIST CONSTANTS.

1 IN. DIA. FRONT ROLL. 7 IN. DIA. CYLINDER.

FRONT ROLL GEAR, 84 T.

Whirl on Spindle, ¾ in. Dia. Ratio Whirl to Cylinder, 8.143

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	922.12	72	29	540.55
76	17	973.35	76	29	570.58
86	17	1101.43	86	29	645.66
96	17	1229.50	96	29	720.74
106	17	1357.57	106	29	795.81
72	21	746.48	72	39	401.95
76	21	787.95	76	39	424.28
86	21	891.63	86	39	480.11
96	21	995.31	96	39	535.93
106	21	1098.98	106	39	591.76

Whirl on Spindle, 1⅛ in. Dia. Ratio Whirl to Cylinder, 7.60

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	860.65	72	29	504.52
76	17	908.46	76	29	532.55
86	17	1028.00	86	29	602.62
96	17	1147.53	96	29	672.69
106	17	1267.07	106	29	742.76
72	21	696.71	72	39	375.15
76	21	735.42	76	39	396.00
86	21	832.19	86	39	448.10
96	21	928.95	96	39	500.21
106	21	1025.72	106	39	552.31

Whirl on Spindle, ⅞ in. Dia. Ratio Whirl to Cylinder, 7.125

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	806.86	72	29	472.99
76	17	851.68	76	29	499.26
86	17	963.75	86	29	564.96
96	17	1075.81	96	29	630.65
106	17	1187.88	106	29	696.34
72	21	653.17	72	39	351.71
76	21	689.46	76	39	371.25
86	21	780.18	86	39	420.10
96	21	870.90	96	39	468.94
106	21	961.61	106	39	517.79

BAND DRIVEN
RING SPINNING FRAME, TWIST CONSTANTS.
1 IN. DIA. FRONT ROLL. 7 IN. DIA. CYLINDER.
FRONT ROLL GEAR, 84 T.

Whirl on Spindle, 15/16" Dia. Ratio Whirl to Cylinder, 6.706

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	759.41	72	29	445.17
76	17	801.60	76	29	469.90
86	17	907.07	86	29	531.73
96	17	1012.54	96	29	593.56
106	17	1118 02	106	29	655.39
72	21	614.76	72	39	331.03
76	21	648.92	76	39	349.42
86	21	734.30	86	39	395.39
96	21	819.65	96	39	441.37
106	21	905.07	106	39	487.35

Whirl on Spindle, 1" Dia. Ratio Whirl to Cylinder, 6.333

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	717 17	72	29	420.41
76	17	757.01	76	29	443.77
86	17	856.62	86	29	502.16
96	17	956.23	96	29	560.55
106	17	1055.83	106	29	618.94
72	21	580.57	72	39	312.62
76	21	612.82	76	39	329.98
86	21	693.46	86	39	373.40
96	21	774.09	96	39	416.82
106	21	854 73	106	39	460.24

Whirl on Spindle, 1 1/16" Dia. Ratio Whirl to Cylinder, 6.000

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	679 46	72	29	398.16
76	17	717.21	76	29	420.28
86	17	811.58	86	29	475.58
96	17	905.95	96	29	530.88
106	17	1000.32	106	29	586.18
72	21	550.08	72	39	296.14
76	21	580.64	76	39	312.59
86	21	657.04	86	39	353.72
96	21	733.44	96	39	394.85
106	21	809.84	106	39	435.98

BAND DRIVEN

RING SPINNING FRAME, TWIST CONSTANTS.

1 1/16 IN. DIA. FRONT ROLL. 7 IN. DIA. CYLINDER.

FRONT ROLL GEAR, 84 T.

Whirl on Spindle, 3/4 in. Dia. Ratio Whirl to Cylinder, 8.143

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	867.89	72	29	508.76
76	17	916.11	76	29	537.03
86	17	1036.65	86	29	607.69
96	17	1157.19	96	29	678.35
106	17	1277.73	106	29	749.01
72	21	702.58	72	39	378.31
76	21	741.61	76	39	399.33
86	21	839.19	86	39	451.87
96	21	936.77	96	39	504.42
106	21	1034.35	106	39	556.96

Whirl on Spindle, 13/16 in. Dia. Ratio Whirl to Cylinder, 7.60

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	810.03	72	29	474.85
76	17	855.03	76	29	501.23
86	17	967.54	86	29	567.18
96	17	1080.04	96	29	633.13
106	17	1192.55	106	29	699.08
72	21	655.74	72	39	353.09
76	21	692.17	76	39	372.71
86	21	783.25	86	39	421.75
96	21	874.32	96	39	470.79
106	21	965.40	106	39	519.83

Whirl on Spindle, 7/8 in. Dia. Ratio Whirl to Cylinder, 7.125

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	759.41	72	29	445.17
76	17	801.59	76	29	469.90
86	17	907.07	86	29	531.73
96	17	1012.54	96	29	593.56
106	17	1118.01	106	29	665.39
72	21	614.76	72	39	331.02
76	21	648.91	76	39	349.41
86	21	734.29	86	39	395.39
96	21	819.67	96	39	441.36
106	21	905.06	106	39	487.34

BAND DRIVEN
RING SPINNING FRAME, TWIST CONSTANTS.
1 1/16 IN. DIA. FRONT ROLL. 7 IN. DIA. CYLINDER
FRONT ROLL GEAR, 84 T.

Whirl on Spindle, 15/16" Dia. Ratio Whirl to Cylinder, 6.706

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	714.81	72	29	419.04
76	17	754.53	76	29	442.32
86	17	853.81	86	29	500.52
96	17	953.09	96	29	558.72
106	17	1052.37	106	29	616.92
72	21	578.74	72	39	311.62
76	21	610.89	76	39	328.93
86	21	691.27	86	39	372.21
96	21	771.65	96	39	415.49
106	21	852.03	106	39	458.77

Whirl on Spindle, 1" Dia. Ratio Whirl to Cylinder, 6.333

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	675.14	72	29	395.78
76	17	712.65	76	29	417.77
86	17	806.42	86	29	472.74
96	17	900.19	96	29	527.71
106	17	993.96	106	29	582.68
72	21	546.55	72	39	294.26
76	21	576.92	76	39	310.61
86	21	652.83	86	39	351.48
96	21	728.74	96	39	392.35
106	21	804.65	106	39	433.22

Whirl on Spindle, 1 1/16" Dia. Ratio Whirl to Cylinder, 6.000

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	639.65	72	29	374.98
76	17	675.18	76	29	395.81
86	17	764.02	86	29	447.89
96	17	852.86	96	29	499.97
106	17	941.70	106	29	552.05
72	21	517.82	72	39	278.78
76	21	546.59	76	39	294.27
86	21	618.51	86	39	332.99
96	21	690.43	96	39	371.71
106	21	762.35	106	39	410.43

BAND DRIVEN

RING SPINNING FRAME, TWIST CONSTANTS.

1⅛ IN. DIA. FRONT ROLL. 7 IN. DIA. CYLINDER.

FRONT ROLL GEAR, 84 T.

Whirl on Spindle, ¾ in. Dia. Ratio Whirl to Cylinder, 8.143

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	819.67	72	29	480.49
76	17	865.20	76	29	507.19
86	17	979.04	86	29	573.92
96	17	1092.89	96	29	640.66
106	17	1206.73	106	29	707.39
72	21	663.54	72	39	357.29
76	21	700.40	76	39	377.14
86	21	792.56	86	39	426.76
96	21	884.72	96	39	476.38
106	21	976.88	106	39	526.01

Whirl on Spindle, $\frac{13}{16}$ in. Dia. Ratio Whirl to Cylinder, 7.60

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	765.02	72	29	448.46
76	17	807.52	76	29	473.37
86	17	913.77	86	29	535.66
96	17	1020.02	96	29	597.95
106	17	1126.28	106	29	660.23
72	21	619.30	72	39	333.47
76	21	653.71	76	39	351.99
86	21	739.72	86	39	398.31
96	21	825.73	96	39	444.63
106	21	911.75	106	39	490.94

Whirl on Spindle, ⅞ in. Dia. Ratio Whirl to Cylinder, 7.125

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	717.20	72	29	420.43
76	17	757.05	76	29	443.79
86	17	856.66	86	29	502.18
96	17	956.27	96	29	560.57
106	17	1055.89	106	29	618.96
72	21	580.59	72	39	312.63
76	21	612.85	76	39	330.00
86	21	693.49	86	39	373.42
96	21	774.13	96	39	416.84
106	21	854.76	106	39	460.26

BAND DRIVEN
RING SPINNING FRAME TWIST CONSTANTS.
1⅛ IN. DIA. FRONT ROLL. 7 IN. DIA. CYLINDER.
FRONT ROLL GEAR, 84 T.

Whirl on Spindle, $^{15}/_{16}$" Dia. Ratio Whirl to Cylinder, 6.706

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	675.22	72	29	395.78
76	17	712.73	76	29	417.72
86	17	806.51	86	29	472.74
96	17	900.29	96	29	527.71
106	17	994.07	106	29	582.68
72	21	546.62	72	39	294.34
76	21	576.99	76	39	310.69
86	21	652.91	86	39	351.57
96	21	728.83	96	39	392.45
106	21	804.75	106	39	433.33

Whirl on Spindle, 1" Dia. Ratio Whirl to Cylinder, 6.333

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	637.70	72	29	373.82
76	17	673.13	76	29	394.59
86	17	761.70	86	29	446.51
96	17	850.27	96	29	498.43
106	17	938.84	106	29	550.35
72	21	516.24	72	39	277.92
76	21	544.92	76	39	293.36
86	21	616.62	86	39	331.96
96	21	688.32	96	39	370.56
106	21	760.02	106	39	409.16

Whirl on Spindle, $1^{1}/_{16}$" Dia. Ratio Whirl to Cylinder, 6.000

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	604.15	72	29	354.10
76	17	637.72	76	29	373.77
86	17	721.63	86	29	422.95
96	17	805.54	96	29	472.13
106	17	889.45	106	29	521.31
72	21	489.10	72	39	263.30
76	21	516.27	76	39	277.93
86	21	581.20	86	39	314.50
96	21	652.13	96	39	351.07
106	21	720.06	106	39	387.64

BAND DRIVEN

RING SPINNING FRAME TWIST TABLE.

1 IN. DIA. FRONT ROLL. 7 IN. DIA. CYLINDER.

FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, ¾ in. Dia. Ratio Whirl to Cylinder, 8.143								
	Jack 72 Cyl. 17	Jack 86 Cyl. 17	Jack 96 Cyl. 17	Jack 106 Cyl. 17	Jack 72 Cyl. 21	Jack 76 Cyl. 21	Jack 86 Cyl. 21	Jack 96 Cyl. 21	Jack 106 Cyl. 21
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	36.89	44.06	49.18	54.30	29.86	31.12	35.67	39.81	43.96
26	35.47	42.36	47.28	52.21	28.71	30.31	34.29	38.28	42.27
27	34.15	40.79	45.54	50.28	27.65	29.18	33.02	36.86	40.70
28	32.93	39.34	43.84	48.48	26.66	28.14	31.84	35.55	39.25
29	31.80	37.98	42.40	46.81	25.74	27.17	30.75	34.32	37.90
30	30.74	36.71	40.98	45.25	24.55	26.27	29.72	33.18	36.63
31	29.75	35.53	39.66	43.79	24.08	25.42	28.76	32.11	35.45
32	28.82	34.42	38.42	42.42	23.32	24.62	27.86	31.10	34.34
33	27.94	33.38	37.26	41.14	22.62	23.88	27.02	30.16	33.24
34	27.12	32.39	36.16	39.93	21.96	23.18	26.22	29.27	32.32
35	26.35	31.47	35.13	38.79	21.33	22.51	25.48	28.43	31.40
36	25.61	30.60	34.15	37.71	20.74	21.89	24.77	27.65	30.53
37	24.92	29.77	33.23	36.69	20.18	21.30	24.10	26.90	29.70
38	24.27	28.98	32.36	35.73	19.64	20.74	23.46	26.19	28.92
39	23.64	28.24	31.53	34.81	19.14	20.20	22 86	25.52	28.18
40	23.05	27.54	30.74	33.94	18.66	19.70	22.29	24.88	27.47
41	22.49	26.86	29.99	33.11	18.21	19.22	21.75	24.28	26.80
42	21.96	26.22	29.27	32.32	17.77	18.76	21.23	23.70	26.26
43	21.44	25.61	28.59	31.57	17.36	18.32	20.74	23.15	25.56
44	20 96	25.03	27.94	30.85	16.97	17.91	20.26	22.62	24.98
45	20.49	24.48	27.32	30.17	16.59	17.51	19.81	22.12	24.42
46	20.05	23.94	26.73	29.51	16.23	17.13	19.60	21.64	23.89
47	19.62	23.43	26.18	28.88	15.88	16.78	18.97	21.18	23.38
48	19.21	22.97	25.61	28.28	15.55	16.42	18.58	20.76	22.90
49	18.82	22.54	25.09	27.70	15.23	16.08	18,20	20.31	22.43
50	18.44	22.03	24.59	27.15	14.93	15.56	17.83	19.91	21.98
51	18.08	21.60	24.11	26.62	14.64	15.45	17.48	19.52	21.55
52	17.73	21.18	23.64	26.11	14.36	15.15	17.15	19.14	21.13
53	17.40	20.78	23.20	25.43	14.05	14.87	16.88	18.78	20.74
54	17.08	20.40	22.77	25.14	13.82	14.59	16.51	18.43	20.35
55	16.77	20.03	22.35	24.65	13.57	14.33	16.21	18.10	19.98
56	16.47	19.70	21.96	24.24	13,33	14.07	15.92	17.77	19.62
57	16.18	19.32	21.57	23.82	13.10	13.82	15.64	17.46	19.28
58	15.90	18.99	21.20	23.40	12.87	13.59	15.37	17.16	18.95
59	15.61	18.67	20.84	23 01	12.65	13.36	15.11	16.95	18.63
60	15.37	18.36	20.49	22.63	12.27	13.13	14.86	16.59	18.32
61	15.12	18.06	20.16	22.26	12.21	12.92	14.62	16.32	18.02
62	14.87	17.76	19.83	21.90	12,04	12.71	11.38	16.05	17.73
63	14.64	17.50	19.52	21.55	11.85	12.51	14.15	15.80	17.44
64	14.41	17.21	19.21	21.21	11.66	12.31	13.93	15.55	17.17
65	14.19	16.95	18.90	20.89	11.48	12.12	13.72	15.31	16.91
66	13.97	16.69	18.63	20.57	11.31	11.94	13.51	15.08	16.62
67	13.76	16.44	18.35	20.26	11.11	11.76	13.31	14.88	16.40

BAND DRIVEN

RING SPINNING FRAME TWIST TABLE.

1 IN. DIA. FRONT ROLL. 7 IN. DIA. CYLINDER.
FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, $\frac{13}{16}$ in. Dia. Ratio Whirl to Cylinder, 7.60								
	Jack 72 Cyl. 17	Jack 86 Cyl. 17	Jack 96 Cyl. 17	Jack 106 Cyl. 17	Jack 72 Cyl. 21	Jack 76 Cyl. 21	Jack 86 Cyl. 21	Jack 96 Cyl. 21	Jack 106 Cyl. 21
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	34.43	41.12	45.90	50.68	27.87	29.42	33.29	37.16	41.03
26	33.10	39.54	44.14	48.73	26.80	28.29	32.01	35.71	39.45
27	31.88	38.07	42.50	46.93	25.80	27.24	30.82	34.41	37.99
28	30.74	36.71	40.98	45.25	24.88	26.27	29.72	33.18	36.63
29	29.68	35.45	39.57	43.69	24.02	25.36	28.70	32.03	35.37
30	28.69	34.27	38.25	42.24	23.22	24.51	27.74	30.97	34.19
31	27.76	33.16	37.02	40.87	22.47	23.72	26.84	29.97	33.09
32	26.90	32.13	35.55	39.60	21.77	22.98	26.01	29.03	32.05
33	26.08	31.15	34.77	38.40	21.11	22.29	25.22	28.15	31.08
34	25.31	30.24	33.75	37.27	20.49	21.63	24.48	27.32	30.17
35	24.59	29.37	32.79	36.20	19.91	21.01	23.78	26.54	29.31
36	23.91	28.56	31.88	35.19	19.35	20.43	23.11	25.80	28.49
37	23.26	27.78	31.01	34.25	18.83	19.88	22.49	25.11	27.72
38	22.65	27.05	30.20	33.34	18.33	19.35	21.90	24.18	26.99
39	22.07	26.36	29.42	32.49	17.86	18.86	21.34	23.82	26.30
40	21.52	25.70	28.69	31.68	17.42	18.39	20.80	23.22	25.64
41	20.99	25.07	27.99	30.90	16.99	17.94	20.30	22.66	25.02
42	20.49	24.48	27.32	30.17	16.59	17.51	19.81	22.12	24.42
43	20.02	23.91	26.69	29.47	16.20	17.10	19.35	21.60	23.85
44	19.56	23.36	26.08	28.80	15.83	16.71	18.91	21.11	23.31
45	19.13	22.84	25.50	28.16	15.48	16.34	18.49	20.64	22.79
46	18.71	22.35	24.95	27.55	15.15	15.99	18.09	20.19	22.30
47	18.31	21.87	24.42	26.96	14.82	15.65	17.71	19.76	21.82
48	17.93	21.42	23.91	26.40	14.51	15.32	17.34	19.14	21.37
49	17.56	20.98	23.42	25.86	14.22	15.01	16 98	18.96	20.93
50	17.21	20.56	22.95	25.34	13.93	14.71	16.64	18.58	20.51
51	16.88	20.11	22.50	24.84	13.66	14.42	16.32	18.21	20.11
52	16.55	19.77	22 07	24.36	13.40	14.14	16.00	17.86	19.72
53	16.24	19.40	21.65	23.91	13.15	13.88	15.70	17.53	19.35
54	15.94	19.04	21.25	23.46	12.90	13.62	15.41	17.20	19.00
55	15.65	18.69	20.86	23.04	12.67	13.37	15.13	16.89	18.65
56	15.37	18.36	20.49	22.63	12.44	13.13	14.86	16.59	18.32
57	15.10	18.04	20.13	22.23	12.22	12.90	14.60	16.30	18.00
58	14.84	17.72	19.79	21.85	12.01	12.68	14.35	16.02	17.68
59	14.59	17.42	19.45	21.48	11.81	12.46	14.10	15.74	17.38
60	14.34	17.13	19.13	21.12	11.61	12.26	13.87	15.48	17.10
61	14.11	16.85	18.81	20.77	11.42	12.06	13 64	15.23	16.81
62	13.88	16.58	18 51	20.44	11.24	11.86	13.42	14.98	16.54
63	13.66	16.32	18.21	20.11	11.06	11.67	13 21	14.75	16.28
64	13 48	16.06	17.93	19.80	10.89	11.49	13.00	14.51	16.03
65	13.27	15.82	17.65	19.49	10.72	11.31	12.80	14.29	15.78
66	13 04	15.58	17.54	19.20	10.56	11.14	12.61	14.08	15.54
67	12.85	15.34	17.13	18.91	10.40	10.98	12.42	13.87	15.31

BAND DRIVEN

RING SPINNING FRAME TWIST TABLE.

1 IN. DIA. FRONT ROLL. 7 IN. DIA. CYLINDER. FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, $\frac{13}{16}$ in. Dia. Ratio Whirl to Cylinder, 7.60								
	Jack 72 Cyl. 29	Jack 76 Cyl. 29	Jack 86 Cyl. 29	Jack 96 Cyl. 29	Jack 106 Cyl. 29	Jack 72 Cyl. 39	Jack 76 Cyl. 39	Jack 86 Cyl. 39	Jack 96 Cyl. 39
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	20.18	21.30	24.10	26.91	29.71	15.01	15.84	17.92	20.01
26	19.40	20.48	23.18	25.87	28.57	14.43	15.23	17.23	19.24
27	18.69	19.72	22.32	24.91	27.51	13.89	14.67	16.60	18.53
28	18.02	19.02	21.52	24.02	26.53	13.40	14.14	16.00	17.86
29	17.40	18.36	20.78	23.20	25.61	12.94	13.66	15.45	17.25
30	16.82	17.75	20.09	22.42	24.76	12.51	13.20	14.94	16.67
31	16.27	17.18	19.44	21.70	23.96	12.10	12.77	14.45	16.14
32	15.77	16.64	18.83	21.02	23.21	11.72	12.37	14.00	15.63
33	15.29	16.14	18.26	20.38	22.51	11.37	12.00	13.58	15.16
34	14.84	15.66	17.72	19.79	21.85	11.03	11.65	13.18	14.71
35	14.41	15.22	17.22	19.22	21.22	10.72	11.31	12.80	14.29
36	14.01	14.79	16.74	18.69	20.63	10.42	11.00	12.45	13.89
37	13.64	14.39	16.28	18.18	20.07	10.14	10.70	12.11	13.52
38	13.28	14.01	15.86	17.70	19.55	9.87	10.42	11.79	13.16
39	12.94	13.66	15.45	17.25	19.05	9.62	10.15	11.49	12.83
40	12.61	13.31	15.07	16.82	18.57	9.38	9.90	11.20	12.51
41	12.31	12.99	14.70	16.41	18.12	9.15	9.66	10.93	12.25
42	12.01	12.68	14.35	16.02	17.68	8.93	9.43	10.67	11.91
43	11.73	12.40	14.01	15.64	17.27	8.72	9.21	10.42	11.63
44	11.46	12.10	13.70	15.29	16.88	8.53	9.00	10.18	11.37
45	11.21	11.83	13.39	14.95	16.51	8.34	8.80	9.96	11.12
46	10.97	11.58	13.10	14.62	16.15	8.16	8.61	9.74	10.87
47	10.73	11.33	12.82	14.31	15.80	7.98	8.43	9.53	10.64
48	10.51	11.09	12.55	14.01	15.47	7.82	8.25	9.34	10.42
49	10.29	10.87	12.30	13.73	15.16	7.66	8.08	9.12	10.21
50	10.09	10.65	12.05	13.45	14.86	7.50	7.92	8.96	10.00
51	9.89	10.44	11.82	13.19	14.56	7.35	7.76	8.79	9.81
52	9.70	10.24	11.59	12.94	14.28	7.21	7.62	8.62	9.62
53	9.52	10.05	11.37	12.69	14.01	7.08	7.47	8.45	9.44
54	9.34	9.86	11.16	12.46	13.75	6.95	7.33	8.30	9.26
55	9.17	9.68	10.96	12.23	13.50	6.82	7.20	8.15	9.09
56	9.01	9.51	10.76	12.01	13.26	6.63	7.07	8.00	8.93
57	8.85	9.34	10.57	11.80	13.03	6.58	6.95	7.86	8.78
58	8.70	9.18	10.39	11.60	12.81	6.47	6.83	7.73	8.62
59	8.55	9.03	10.21	11.40	12.59	6.36	6.71	7.59	8.48
60	8.41	8.88	10.04	11.21	12.38	6.25	6.60	7.47	8.34
61	8.27	8.73	9.88	11.03	12.18	6.15	6.49	7.35	8.20
62	8.14	8.59	9.72	10.85	11.98	6.05	6.39	7.23	8.06
63	8.01	8.45	9.57	10.68	11.79	5.95	6.29	7.11	7.94
64	7.88	8.32	9.42	10.51	11.61	5.86	6.19	7.00	7.82
65	7.76	8.19	9.27	10.35	11.43	5.77	6.09	6.89	7.70
66	7.64	8.07	9.13	10.19	11.25	5.68	6.00	6.79	7.58
67	7.53	7.95	8.99	10.04	11.09	5.60	5.91	6.69	7.47

BAND DRIVEN

RING SPINNING FRAME TWIST TABLE.

1 IN. DIA. FRONT ROLL. 7 IN. DIA. CYLINDER.
FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, 7/8 in. Dia. Ratio Whirl to Cylinder, 7.125								
	Jack 96 Cyl. 17	Jack 72 Cyl. 21	Jack 76 Cyl. 21	Jack 86 Cyl. 21	Jack 96 Cyl. 21	Jack 72 Cyl. 29	Jack 86 Cyl. 29	Jack 72 Cyl. 39	Jack 86 Cyl. 39
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	43.03	26.13	27.58	31.21	34.44	18.92	22.60	14.07	16.80
26	41.38	25.12	26.52	30.01	33.50	18.19	21.73	13 53	16.16
27	39.84	24.19	25.54	28.90	32.26	17.52	20.92	13.02	15.56
28	38.42	23.33	24.62	27.86	31.10	16.89	20.18	12.56	15.00
29	37.10	22.52	23.77	26.90	30.03	16.31	19.48	12.13	14.49
30	35.86	21.77	22.98	26.01	29.03	15.77	18.83	11.72	14.00
31	34.70	21.07	22.24	25.17	28.09	15.26	18.22	11.35	13.55
32	33.62	20.41	21.55	24.38	27.21	14.78	17.65	10.99	13.13
33	32.60	19.79	20.89	23.64	26.39	14.33	17.12	10.66	12.73
34	31.64	19.21	20.28	22.95	25.61	13.91	16.62	10.34	12.36
35	30.74	18.66	19.70	22.29	24.88	13.51	16.14	10.05	12.00
36	29.88	18.14	19.15	21.67	24.19	13.14	15.69	9.77	11.67
37	29.08	17.65	18.63	21.09	23.54	12.78	15.27	9.51	11.38
38	28.31	17.19	18.14	20.53	22.92	12.45	14.87	9.26	11.06
39	27.58	16.75	17.68	20.00	22.33	12.13	14.49	9.02	10.77
40	26.90	16.33	17.24	19.50	21.77	11.82	14.12	8.79	10.50
41	26.24	15.93	16.82	19.03	21.49	11.54	13.78	8.58	10.25
42	25.61	15.55	16.42	18.58	20.71	11.26	13.40	8.37	10.00
43	25.02	15.19	16.03	18.12	20.25	11.00	13.14	8.18	9.77
44	24.45	14.84	15.67	17.73	19.79	10.75	12.84	7.99	9.55
45	23.91	14.51	15.32	17.34	19.35	10.51	12.55	7.81	9.34
46	23.39	14.20	14.99	16.96	18.93	10.28	12.28	7.65	9.13
47	22.89	13.90	14.67	16.60	18.74	10.06	12.02	7.48	8.94
48	22.41	13.61	14.36	16.25	18.14	9.85	11.77	7.33	8.75
49	21.96	13.33	14.07	15.92	17.77	9.65	11.53	7.18	8.57
50	21.51	13.06	13.79	15.60	17.42	9.46	11.30	7.03	8.40
51	21.09	12.81	13.52	15.30	17.08	9.27	11.08	6.90	8.24
52	20.69	12.56	13.26	15.00	16.94	9.10	10.86	6.76	8.08
53	20.30	12.32	13.01	14.72	16.43	8.92	10.66	6 64	7.93
54	19.92	12.10	12.77	14.45	16.13	8.76	10.46	6.51	7.78
55	19.56	11.88	12.54	14.19	15.83	8.60	10.27	6.39	7.64
56	19.39	11.66	12.31	13.93	15.55	8.44	10.09	6.28	7.50
57	18.87	11.46	12.10	13.69	15.28	8.30	9.91	6.17	7.37
58	18.55	11.26	11.89	13.45	15.02	8.15	9.74	6.06	7.24
59	18.23	11.07	11.69	13.22	14.76	8.02	9.58	5.96	7.12
60	17.93	10.89	11.49	13.00	14.51	7.88	9.42	5.86	7.00
61	17.64	10.71	11.30	12.79	14.28	7.75	9.26	5.77	6.89
62	17.35	10.54	11.12	12.58	14.05	7.63	9.11	5.67	6 79
63	17.08	10.37	10.94	12.38	13.82	7.51	8.97	5.58	6.67
64	16.81	10.21	10.77	12.19	13.61	7.39	8.83	5.50	6.56
65	16.55	10.05	10.61	12.00	13.40	7.28	8.69	5.41	6.46
66	16.30	9.90	10.45	11.82	13.20	7.17	8.56	5.33	6.36
67	16.07	9.75	10.29	11.64	13.00	7.06	8.43	5.25	6.27

BAND DRIVEN

RING SPINNING FRAME TWIST TABLE.

1 IN. DIA. FRONT ROLL. 7 IN. DIA. CYLINDER.

FRONT ROLL GEAR, 84 T.

Whirl on Spindle, $\frac{9}{16}$" dia. Ratio Whirl to Cylinder, 6.706

Twist Change Gear	Jack 72 Cyl. 17	Jack 86 Cyl. 17	Jack 96 Cyl. 17	Jack 106 Cyl. 17	Jack 72 Cyl. 21	Jack 76 Cyl. 21	Jack 86 Cyl. 21	Jack 96 Cyl. 21	Jack 106 Cyl. 21
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	30.38	36.28	40.50	44.72	24.59	25.95	29.37	32.78	36.20
26	29.21	34.90	38.98	43.06	23.62	24.96	28.24	31.51	34.81
27	28.13	33.60	37.50	41.40	22.77	24.05	27.19	30.35	33.51
28	27.12	32.39	36.18	39.96	21.94	23.18	26.21	29.28	32.32
29	26.19	31.29	34.91	38.59	21.19	22.40	25.32	28.25	31.21
30	25.31	30.23	33.79	37.28	20.48	21.65	24.45	27.32	30.17
31	24.50	29.23	32.66	36.07	19.80	20.94	23.68	26.42	29.20
32	23.73	28.32	31.62	34.93	19.19	20.29	22.94	25.61	28.29
33	23.01	27.49	30.67	33.86	18.62	19.67	22.23	24.83	27.42
34	22.33	26.68	29.79	32.89	18.08	19.10	21.59	24.10	26.61
35	21.70	25.92	28.92	31.94	17.54	18.54	20.98	23.41	25.85
36	21.09	25.20	28.17	31.04	17.08	18.04	20.39	22.75	25.17
37	20.52	24.52	27.39	30.19	16.61	17.54	19.84	22.15	24.48
38	19.98	23.87	26.62	29.42	16.17	17.09	19.31	21.57	23.81
39	19.47	23.25	25.98	28.65	15.75	16.64	18.82	21.01	23.21
40	18.97	22.69	25.31	27.95	15.37	16.23	18.37	20.49	22.63
41	18.52	22.12	24.68	27.25	14.98	15.83	17.90	19.98	22.07
42	18.08	21.60	24.10	26.59	14.63	15.45	17.48	19.54	21.55
43	17.66	21.09	23.55	25.98	14.29	15.10	17.07	19.06	21.04
44	17.27	20.60	23.00	25.40	13.97	14.77	16.69	18.63	20.58
45	16.89	20.19	22.50	24.82	13.66	14.43	16.31	18.19	20.11
46	16.50	19.72	22.01	24.30	13.37	14.12	15.86	17.81	19.68
47	16.16	19.30	21.51	23.78	13.08	13.82	15.62	17.42	19.27
48	15.82	18.90	21.08	23.27	12.80	13.53	15.30	17.07	18.87
49	15.50	18.51	20.66	22.81	12.54	13.27	14.98	16.71	18.47
50	15.19	18.17	20.25	22.36	12.29	12.99	14.68	16.41	18.11
51	14.89	17.79	19.85	21.92	12.01	12.73	14.39	16.06	17.75
52	14.61	17.46	19.48	21.50	11.81	12.48	14.12	15.75	17.41
53	14.32	17.11	19.11	21.09	11.59	12.25	13.85	15.46	17.08
54	14.07	16.80	18.76	20.70	11.38	12.01	13.59	15.18	16.77
55	13.81	16.50	18.40	20.32	11.18	11.80	13.34	14.89	16.46
56	13.56	16.19	18.08	19.97	10.97	11.59	13.11	14.62	16.17
57	13.31	15.92	17.77	19.60	10.78	11.38	12.88	14.37	15.88
58	13.09	15.63	17.46	19.28	10.59	11.19	12.66	14.12	15.61
59	12.87	15.38	17.18	18.94	10.41	11.00	12.43	13.89	15.34
60	12.67	15.11	16.88	18.63	10.24	10.82	12.24	13.66	15.09
61	12.44	14.88	16.59	18.32	10.08	10.63	12.03	13.42	14.82
62	12.24	14.63	16.32	18.02	9.92	10.48	11.82	13.21	14.59
63	12.04	14.40	16.08	17.74	9.75	10.29	11.64	12.99	14.38
64	11.87	14.18	15.81	17.47	9.60	10.14	11.48	12.80	14.14
65	11.68	13.96	15.58	17.19	9.45	9.99	11.29	12.59	13.92
66	11.51	13.75	15.33	16.94	9.32	9.83	11.11	12.42	13.71
67	11.33	13.54	15.10	16.69	9.18	9.68	10.96	12.22	13.51

BAND DRIVEN

RING SPINNING FRAME TWIST TABLE.

1 IN. DIA. FRONT ROLL. 7 IN. DIA. CYLINDER

FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, 1" Dia. Ratio Whirl to Cylinder, 6.333								
	Jack 72 Cyl. 17	Jack 86 Cyl. 17	Jack 96 Cyl. 17	Jack 106 Cyl. 17	Jack 72 Cyl. 21	Jack 76 Cyl. 21	Jack 86 Cyl. 21	Jack 96 Cyl. 21	Jack 106 Cyl. 21
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	28.70	34.26	38.25	42.23	23.22	24.51	27.74	30.96	34.19
26	27.58	32.94	36.77	40.61	22.33	23.59	26.67	29.79	32.87
27	26.57	31.75	35.40	39.10	21.50	22.70	25.68	28.67	31.66
28	25.64	30.61	34.15	37.70	20.73	21.89	24.79	27.65	30.53
29	24.75	29.58	32.98	36.40	20.02	21.13	23.92	26.70	29.48
30	23.91	28.55	31.86	35.19	19.35	20.43	23.17	25.82	28.49
31	23.17	27.61	30.82	34.02	18.72	19.76	22.39	24.97	27.55
32	22.41	26.77	29.88	32.99	18.15	19.14	21.69	24.20	26.69
33	21.76	25.95	28.98	31.99	17.58	18.57	21.02	23.46	25.90
34	21.11	25.20	28.13	31.04	17.07	18.03	20.41	22.79	25.17
35	20.51	24.47	27.31	30.17	16.58	17.51	19.81	22.14	24.42
36	19.93	23.81	26.56	29.32	16.12	17.03	19.26	21.50	23.75
37	19.39	23.17	25.84	28.52	15.69	16.57	18.74	20.93	23.09
38	18.89	22.55	25.18	27.78	15.27	16.13	18.25	20.39	22.48
39	18.39	21.97	24.52	27.09	14.89	15.71	17.78	19.86	21.92
40	17.94	21.42	23.91	26.40	14.52	15.32	17.32	19.37	21.39
41	17.50	20.89	23.31	25.75	14.16	14.95	16.92	18.88	20.85
42	17.09	20.40	22.77	25.14	13.82	14.59	16.52	18.43	20.35
43	16.69	19.92	22.22	24.55	13.50	14.26	16.13	18.00	19.86
44	16.31	19.47	21.73	23.98	13.19	13.93	15.77	17.60	19.42
45	15.96	19.04	21.25	23.44	12.90	13.61	15.41	17.21	18.99
46	15.59	18.62	20.79	22.95	12.62	13.32	15.08	16.83	18.57
47	15.27	18.22	20.35	22.46	12.34	13.04	14.77	16.48	18.18
48	14.95	17.84	19.93	21.98	12.09	12.78	14.44	16.12	17.79
49	14.64	17.48	19.52	21.54	11.84	12.51	14.16	15.79	17.43
50	14.37	17.14	19.13	21.10	11.61	12.26	13.88	15.49	17.09
51	14.07	16.78	18.76	20.69	11.38	12.01	13.60	15.18	16.74
52	13.79	16.48	18.39	20.28	11.17	11.78	13.34	14.89	16.43
53	13.54	16.16	18.05	19.90	10.95	11.57	13.09	14.61	16.12
54	13.29	15.87	17.70	19.54	10.74	11.34	12.84	14.33	15.82
55	13.04	15.58	17.38	19.18	10.57	11.13	12.62	14.08	15.54
56	12.82	15.30	17.08	18.83	10.37	10.93	12.38	13.82	15.27
57	12.59	15.02	16.77	18.51	10.19	10.75	12.18	13.59	14.98
58	12.38	14.77	16.48	18.19	10.01	10.58	11.96	13.36	14.73
59	12.18	14.51	16.21	17.88	9.83	10.39	11.76	13.12	14.48
60	11.95	14.28	15.93	17.59	9.67	10.21	11.56	12.90	14.25
61	11.76	14.04	15.67	17.30	9.52	10.05	11.38	12.69	14.01
62	11.58	13.82	15.42	17.02	9.36	9.88	11.19	12.48	13.78
63	11.38	13.61	15.18	16.75	9.22	9.73	11.01	12.29	13.57
64	11.21	13.39	14.94	16.48	9.07	9.58	10.83	12.16	13.33
65	11.04	13.19	14.72	16.23	8.93	9.43	10.68	11.91	13.14
66	10.87	12.98	14.49	15.98	8.79	9.28	10.51	11.73	12.96
67	10.71	12.79	14.27	15.75	8.67	9.14	10.36	11.57	12.76

BAND DRIVEN
RING SPINNING FRAME TWIST TABLE.
1 IN. DIA. FRONT ROLL 7 IN. DIA CYLINDER
FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, 1" Dia. Ratio Whirl to Cylinder, 6.333								
	Jack 72 Cyl. 29	Jack 76 Cyl. 29	Jack 86 Cyl. 29	Jack 96 Cyl. 29	Jack 106 Cyl. 29	Jack 72 Cyl. 39	Jack 76 Cyl. 39	Jack 86 Cyl. 39	Jack 96 Cyl. 39
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	16.81	17.75	20.09	22.41	24.76	12.50	13.20	14.93	16.67
26	16.18	17.08	19.32	21.56	23.81	12.01	12.69	14.36	16.03
27	15.58	16.44	18.62	20.76	22.92	11.58	12.21	13.82	15.45
28	15.01	15.87	17.96	20.02	22.10	11.17	11.79	13.34	14.89
29	14.50	15.31	17.32	19.33	21.35	10.78	11.38	12.89	14.38
30	14.01	14.80	16.76	18.68	20.62	10.42	11.00	12.45	13.90
31	13.57	14.32	16.21	18.08	19.96	10.08	10.62	12.06	13.45
32	13.13	13.88	15.70	17.52	19.35	9.77	10.31	11.68	13.03
33	12.73	13.46	15.22	16.98	18.76	9.47	10.00	11.31	12.63
34	12.37	13.06	14.78	16.49	18.20	9.19	9.71	10.98	12.27
35	12.01	12.69	14.36	16.02	17.69	8.93	9.43	10.68	11.91
36	11.68	12.32	13.97	15.57	17.19	8.68	9.17	10.38	11.59
37	11.37	12.00	13.58	15.14	16.72	8.44	8.92	10.10	11.27
38	11.08	11.69	13.22	14.74	16.29	8.23	8.68	9.83	10.98
39	10.79	11.39	12.89	14.38	15.87	8.02	8.47	9.57	10.69
40	10.51	11.09	12.55	14.01	15.48	7.82	8.25	9.34	10.41
41	10.25	10.82	12.25	13.67	15.09	7.62	8.04	9.11	10.18
42	10.01	10.58	11.97	13.34	14.73	7.44	7.85	8.89	9.93
43	9.77	10.32	11.69	13.03	14.39	7.26	7.67	8.69	9.69
44	9.56	10.09	11.42	12.73	14.06	7.10	7.50	8.49	9.48
45	9.34	9.87	11.17	12.46	13.76	6.94	7.33	8.30	9.27
46	9.13	9.66	10.92	12.19	13.46	6.79	7.17	8.12	9.07
47	8.94	9.44	10.69	11.92	13.17	6.65	7.02	7.94	8.87
48	8.76	9.25	10.48	11.68	12.90	6.51	6.87	7.78	8.69
49	8.56	9.07	10.25	11.44	12.63	6.38	6.74	7.62	8.51
50	8.41	8.88	10.04	11.21	12.38	6.25	6.60	7.47	8.34
51	8.24	8.71	9.85	10.99	12.12	6.13	6.47	7.33	8.17
52	8.08	8.54	9.66	10.78	11.91	6.01	6.34	7.18	8.02
53	7.93	8.38	9.48	10.58	11.68	5.89	6.22	7.05	7.87
54	7.78	8.22	9.31	10.39	11.47	5.78	6.11	6.92	7.73
55	7.64	8.08	9.14	10.19	11.26	5.68	6.00	6.79	7.58
56	7.51	7.93	8.97	10.01	11.05	5.58	5.89	6.67	7.44
57	7.37	7.78	8.82	9.83	10.86	5.48	5.79	6.55	7.32
58	7.24	7.66	8.67	9.67	10.67	5.38	5.69	6.41	7.18
59	7.12	7.53	8.52	9.50	10.49	5.30	5.59	6.34	7.07
60	7.01	7.40	8.38	9.34	10.31	5.21	5.49	6.23	6.95
61	6.88	7.28	8.24	9.18	10.15	5.12	5.41	6.12	6.84
62	6.78	7.16	8.10	9.04	9.98	5.04	5.32	6.02	6.73
63	6.67	7.05	7.98	8.89	9.82	4.96	5.23	5.93	6.62
64	6.57	6.94	7.85	8.76	9.67	4.88	5.15	5.84	6.52
65	6.47	6.83	7.73	8.62	9.52	4.81	5.08	5.75	6.42
66	6.36	6.73	7.62	8.49	9.38	4.74	5.00	5.66	6.32
67	6.28	6.63	7.50	8.37	9.24	4.67	4.92	5.57	6.22

BAND DRIVEN

RING SPINNING FRAME TWIST TABLE.

1 IN. DIA. FRONT ROLL. 7 IN. DIA. CYLINDER

FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, $1^{1}/_{16}$" Dia. Ratio Whirl to Cylinder, 6.000								
	Jack 96 Cyl. 17	Jack 72 Cyl. 21	Jack 76 Cyl. 21	Jack 86 Cyl. 21	Jack 96 Cyl. 21	Jack 72 Cyl. 29	Jack 86 Cyl. 29	Jack 72 Cyl. 39	Jack 86 Cyl. 39
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	28.70	22.00	23.22	26.28	29.34	15.92	19.02	11.85	14.15
26	27.59	21.18	22.33	25.27	28.21	15.31	18.29	11.39	13.61
27	26.59	20.38	21.51	24.33	27.16	14.75	17.61	10.97	13.10
28	25.62	19.63	20.74	23.46	26.19	14.22	16.99	10.58	12.63
29	24.73	18.96	20.02	22.66	25.29	13.73	16.40	10.21	12.20
30	23.91	18.34	19.35	21.90	24.45	13.27	15.85	9.87	11.79
31	23.13	17.74	18.73	21.19	23.66	12.84	15.31	9.55	11.41
32	22.41	17.19	18.17	20.53	22.92	12.44	14.86	9.25	11.05
33	21.72	16.67	17.59	19.91	22.23	12.07	14.41	8.97	10.72
34	21.10	16.18	17.08	19.32	21.57	11.71	13.99	8.71	10.10
35	20.49	15.71	16.59	18.77	20.96	11.38	13.59	8.46	10.11
36	19.92	15.28	16.13	18.25	20.37	11.06	13.21	8.23	9.83
37	19.39	14.87	15.69	17.75	19.82	10.76	12.85	8.00	9.56
38	18.88	14.48	15.28	17.29	19.30	10.48	12.52	7.79	9.31
39	18.40	14.10	14.89	16.85	18.81	10.21	12.19	7.59	9.07
40	17.93	13.75	14.51	16.42	18.34	9.95	11.89	7.40	8.84
41	17.50	13.41	14.16	16.03	17.89	9.71	11.60	7.22	8.63
42	17.08	13.10	13.82	15.64	17.46	9.48	11.32	7.05	8.42
43	16.69	12.79	13.50	15.28	17.06	9.26	11.06	6.89	8.23
44	16.30	12.50	13.19	14.93	16.67	9.05	10.81	6.73	8.04
45	15.94	12.22	12.90	14.60	16.30	8.85	10.57	6.58	7.86
46	15.59	11.96	12.62	14.28	15.94	8.66	10.34	6.44	7.69
47	15.26	11.71	12.35	13.98	15.61	8.47	10.12	6.30	7.53
48	14.94	11.46	12.09	13.69	15.28	8.30	9.91	6.17	7.37
49	14.65	11.23	11.84	13.41	14.97	8.13	9.71	6.04	7.22
50	14.35	11.00	11.61	13.14	14.67	7.96	9.51	5.92	7.07
51	14.06	10.78	11.38	12.88	14.38	7.81	9.33	5.81	6.94
52	13.80	10.58	11.17	12.64	14.10	7.66	9.15	5.70	6.80
53	13.55	10.38	10.96	12.40	13.84	7.51	8.97	5.59	6.67
54	13.28	10.19	10.75	12.17	13.58	7.37	8.81	5.48	6.55
55	13.05	10.00	10.56	11.95	13.34	7.24	8.65	5.38	6.43
56	12.81	9.83	10.37	11.73	13.10	7.11	8.49	5.29	6.31
57	12.59	9.66	10.19	11.53	12.87	6.99	8.34	5.20	6.21
58	12.38	9.48	10.01	11.33	12.64	6.86	8.20	5.11	6.10
59	12.17	9.32	9.84	11.14	12.43	6.75	8.06	5.02	6.00
60	11.96	9.17	9.67	10.95	12.22	6.64	7.93	4.94	5.90
61	11.77	9.02	9.52	10.77	12.02	6.53	7.80	4.85	5.80
62	11.58	8.87	9.37	10.60	11.83	6.42	7.67	4.78	5.71
63	11.39	8.74	9.22	10.43	11.64	6.32	7.55	4.70	5.61
64	11.21	8.60	9.07	10.27	11.46	6.22	7.43	4.63	5.53
65	11.02	8.47	8.94	10.11	11.28	6.13	7.32	4.56	5.44
66	10.88	8.34	8.80	9.96	11.11	6.03	7.21	4.49	5.36
67	10.70	8.22	8.66	9.81	10.95	5.94	7.10	4.42	5.28

BAND DRIVEN

RING SPINNING FRAME TWIST TABLE.

$1\frac{1}{16}$ IN. DIA. FRONT ROLL. 7 IN. DIA. CYLINDER.
FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, ¾ in. Dia. Ratio Whirl to Cylinder, 8.143					Whirl on Spin., $\frac{13}{16}$ in. Dia. Ratio Whirl to Cyl., 7.60			
	Jack 76 Cyl. 21	Jack 72 Cyl. 17	Jack 106 Cyl. 21	Jack 86 Cyl. 17	Jack 106 Cyl. 17	Jack 76 Cyl. 21	Jack 72 Cyl. 17	Jack 86 Cyl. 17	Jack 96 Cyl. 17
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	29.66	34.72	41.37	41.46	51.11	27.69	32.40	38.70	43.22
26	28.52	33.38	39.78	39.87	49.14	26.62	31.16	37.21	41.56
27	27.47	32.14	38.31	38.39	47.32	25.64	30.00	35.83	40.02
28	26.49	31.00	36.94	37.02	45.63	24.72	28.93	34.55	38.59
29	25.57	29.93	35.67	35.75	44.06	23.87	27.93	33.36	37.26
30	24.72	28.93	34.48	34.55	42.59	23.07	27.00	32.25	36.01
31	23.92	28.00	33.37	33.44	41.22	22.33	26.13	31.21	34.85
32	23.18	27.12	32.32	32.39	39.93	21.63	25.31	30.24	33.76
33	22.47	26.30	31.34	31.41	38.72	20.97	24.55	29.32	32.74
34	21.81	25.53	30.42	30.49	37.58	20.36	23.82	28.46	31.78
35	21.19	24.80	29.55	29.62	36.51	19.78	23.14	27.64	30.87
36	20.60	24.11	28.73	28.80	35.49	19.23	22.50	26.88	30.01
37	20.04	23.46	27.96	28.02	34.53	18.71	21.89	26.15	29.20
38	19.52	22.84	27.22	27.28	33.62	18.21	21 32	25.46	28.43
39	19.02	22.25	26.52	26.58	32.76	17.75	20.77	24.81	27.70
40	18.54	21.70	25.86	25.92	31.94	17.30	20.25	24.19	27.01
41	18.09	21.17	25.23	25.28	31.16	16.88	19.76	23.60	26.35
42	17.66	20.66	24.63	24.68	30.42	16.48	19.29	23.04	25.72
43	17.25	20.18	24.05	24.11	29.71	16.10	18.84	22.50	25.13
44	16.85	19.72	23.51	23.56	29.04	15.73	18.41	21.99	24.56
45	16.48	19.29	22.99	23.04	28.39	15.38	18.00	21.50	24.01
46	16.12	18.87	22.49	22.54	27.78	15.05	17.61	21.03	23.49
47	15.78	18.47	22.01	22.06	27.19	14.73	17.23	20.59	22.99
48	15.45	18.08	21.55	21.60	26.62	14.42	16.88	20.16	22.51
49	15.13	17.71	21.11	21.16	26.08	14.13	16.53	19.75	22.05
50	14.83	17.36	20.69	20.73	25.55	13.84	16.20	19.35	21.61
51	14.54	17.02	20.28	20.33	25.05	13.57	15.88	18.97	21.18
52	14.26	16.69	19.89	19.94	24.57	13.31	15.58	18.61	20.78
53	13.99	16.38	19.52	19.56	24.11	13.06	15.28	18.26	20.39
54	13.73	16.07	19.15	19.20	23.66	12.82	15.00	17.92	20.01
55	13.48	15.78	18.81	18.85	23.23	12.58	14.73	17.59	19.64
56	13.24	15.50	18.47	18.51	22.82	12.36	14.46	17.28	19.29
57	13.01	15.23	18.15	18.19	22.42	12.14	14.21	16.97	18.96
58	12.79	14.96	17.83	17.87	22.03	11.93	13.97	16.68	18.63
59	12.57	14.71	17.53	17.57	21.66	11.73	13.73	16.40	18.31
60	12.36	14.46	17.24	17.28	21.30	11.54	13.50	16.13	18.01
61	12.16	14.23	16.96	16.99	20.95	11.35	13.28	15.86	17.71
62	11.96	14.00	16.68	16.72	20.61	11.16	13.07	15.61	17.43
63	11.77	13.78	16.42	16.45	20.28	10.99	12.86	15.36	17.15
64	11.59	13.56	16.16	16.20	19.96	10.81	12.66	15.12	16.88
65	11.41	13.35	15.91	15.95	19.66	10.65	12.46	14.89	16.62
66	11.24	13.15	15.67	15.71	19.36	10.49	12 27	14.66	16.37
67	11.07	12.95	15.44	15.47	19.07	10.33	12.09	14.44	16.13

BAND DRIVEN

RING SPINNING FRAME TWIST TABLE.

1 1/16 IN. DIA. FRONT ROLL. 7 IN. DIA. CYLINDER

FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, 7/8" Dia. Ratio Whirl to Cylinder, 7.125								
	Jack 72 Cyl. 17	Jack 86 Cyl. 17	Jack 96 Cyl. 17	Jack 106 Cyl. 17	Jack 72 Cyl. 21	Jack 76 Cyl. 21	Jack 86 Cyl. 21	Jack 96 Cyl. 21	Jack 106 Cyl. 21
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	30.38	36.28	40.50	44.72	24.59	25.96	29.37	32.79	36.20
26	29.20	34.91	38.96	43.00	23.64	24.95	28.24	31.52	34.80
27	28.15	33.61	37.50	41.44	22.77	24.02	27.20	30.35	33.55
28	27.14	32.41	36.17	39.92	21.95	23.18	26.22	29.27	32.35
29	26.20	31.31	34.92	38.55	21.20	22.38	25.32	28.26	31.21
30	25.32	30.25	33.74	37.30	20.48	21.62	24.46	27.31	30.17
31	24.50	29.28	32.65	36.05	19.83	20.92	23.69	26.44	29.20
32	23.74	28.38	31.63	34.95	19.20	20.25	22.95	25.60	28.29
33	23.02	27.52	30.68	33.88	18.62	19.66	22.24	24.85	27.43
34	22.35	26.71	29.79	32.88	18.08	19.07	21.60	24.11	26.63
35	21.70	25.94	28.93	31.95	17.57	18.53	20.99	23.40	25.85
36	21.10	25.22	28.17	31.02	17.08	18.02	20.40	22.77	25.14
37	20.54	24.54	27.38	30.20	16.62	17.53	19.85	22.16	24.45
38	19.98	23.88	26.63	29.40	16.18	17.07	19.32	21.58	23.81
39	19.46	23.27	25.98	28.67	15.76	16.63	18.83	21.01	23.20
40	18.99	22.68	25.31	27.95	15.37	16.22	18.36	20.49	22.63
41	18.53	22.17	24.68	27.24	14.98	15.82	17.91	19.98	22.07
42	18.08	21.61	24.10	26.60	14.63	15.44	17.48	19.50	21.55
43	17.66	21.11	23.57	26.00	14.30	15.08	17.08	19.05	21.04
44	17.27	20.63	23.00	25.40	13.97	14.73	16.69	18.62	20.57
45	16.88	20.18	22.51	24.84	13.66	14.41	16.22	18.21	20.11
46	16.51	19.72	22.00	24.30	13.37	14.10	15.96	17.81	19.68
47	16.16	19.30	21.56	23.78	13.08	13.80	15.62	17.43	19.25
48	15.82	18.90	21.09	23.30	12.80	13.51	15.29	17.07	18.85
49	15.49	18.52	20.65	22.80	12.54	13.23	14.98	16.72	18.47
50	15.19	18.14	20.25	22.36	12.30	12.98	14.69	16.39	18.10
51	14.89	17.79	19.85	21.92	12.05	12.71	14.40	16.06	17.74
52	14.60	17.45	19.47	21.50	11.81	12.47	14.12	15.76	17.40
53	14.32	17.13	19.10	21.08	11.60	12.23	13.86	15.46	17.08
54	14.06	16.80	18.75	20.68	11.38	12.01	13.60	15.17	16.76
55	13.80	16.50	18.40	20.32	11.18	11.78	13.34	14.89	16.45
56	13.57	16.20	18.08	19.95	10.98	11.58	13.11	14.63	16.16
57	13.32	15.92	17.77	19.60	10.78	11.37	12.88	14.38	15.88
58	13.09	15.66	17.45	19.27	10.59	11.18	12.66	14.13	15.60
59	12.87	15.38	17.17	18.94	10.42	10.99	12.44	13.88	15.34
60	12.66	15.12	16.88	18.63	10.25	10.82	12.24	13.66	15.08
61	12.45	14.88	16.60	18.32	10.08	10.62	12.03	13.43	14.83
62	12.25	14.64	16.32	18.02	9.92	10.46	11.83	13.22	14.59
63	12.04	14.41	16.07	17.74	9.76	10.28	11.67	13.00	14.37
64	11.87	14.19	15.82	17.47	9.61	10.13	11.48	12.80	14.14
65	11.69	13.97	15.58	17.20	9.46	9.97	11.29	12.60	13.92
66	11.51	13.77	15.34	16.94	9.32	9.83	11.12	12.41	13.71
67	11.33	13.54	15.11	16.69	9.18	9.69	10.96	12.23	13.51

BAND DRIVEN
RING SPINNING FRAME TWIST TABLE.
$1\frac{1}{16}$ IN. DIA. FRONT ROLL. 7 IN. DIA. CYLINDER
FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, $\frac{7}{8}$" Dia. Ratio Whirl to Cylinder, 7.125								
	Jack 72 Cyl. 29	Jack 86 Cyl. 29	Jack 96 Cyl. 29	Jack 106 Cyl. 29	Jack 72 Cyl. 39	Jack 76 Cyl. 39	Jack 86 Cyl. 39	Jack 96 Cyl. 39	Jack 106 Cyl. 39
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	17.81	21.27	23.74	26.62	13.24	13.98	15.82	17.65	19.49
26	17.12	20.42	22.84	25.62	12.73	13.43	15.20	16.97	18.75
27	16.49	19.69	21.98	24.67	12.27	12.93	14.63	16.35	18.06
28	15.91	18.99	21.20	23.79	11.82	12.48	14.12	15.77	17.41
29	15.36	18.33	20.47	22.98	11.41	12.04	13.63	15.22	16.81
30	14.85	17.72	19.78	22.22	11.03	11.63	13.17	14.72	16.25
31	14.37	17.16	19.15	21.47	10.68	11.27	12.74	14.24	15.73
32	13.91	16.62	18.55	20.82	10.34	10.91	12.35	13.79	15.23
33	13.50	16.11	17.98	20.18	10.03	10.58	11.98	13.38	14.77
34	13.10	15.64	17.46	19.58	9.74	10.27	11.62	12.98	14.33
35	12.72	15.20	16.96	19.04	9.46	9.97	11.29	12.62	13.92
36	12.38	14.78	16.49	18.50	9.19	9.70	10.97	12.27	13.53
37	12.03	14.38	16.04	18.00	8.94	9.44	10.68	11.93	13.17
38	11.72	14.00	15.62	17.53	8.72	9.18	10.39	11.62	12.83
39	11.42	13.63	15.22	17.08	8.48	8.95	10.13	11 32	12.50
40	11.13	13.29	14.84	16.63	8.28	8.74	9.88	11.03	12.18
41	10.87	12.97	14.48	16.23	8.07	8.52	9.64	10.77	11.88
42	10.60	12.66	14.12	15.85	7.88	8.32	9.41	10.51	11.61
43	10.37	12.37	13.80	15.48	7.70	8.12	9.18	10.27	11.34
44	10.12	12.08	13.49	15.12	7.52	7.94	8.98	10.03	11.08
45	9.89	11.82	13.19	14.78	7.36	7.76	8.77	9.81	10.83
46	9.68	11.56	12.90	14.47	7.19	7.58	8.58	9.59	10.60
47	9.47	11.32	12.62	14.16	7.04	7.43	8.41	9.38	10.38
48	9.28	11.08	12.37	13.87	6.90	7.27	8.23	9.19	10.16
49	9.08	10.85	12.11	13.58	6.76	7.13	8.06	9.00	9.94
50	8.90	10.63	11.87	13.31	6.62	6.99	7.91	8.83	9.75
51	8.73	10.42	11.65	13.04	6.48	6.84	7.74	8.66	9.56
52	8.56	10.22	11.41	12.79	6.37	6.72	7.59	8.48	9.37
53	8.40	10.03	11.20	12.55	6.24	6.58	7.45	8.33	9.19
54	8.24	9.84	10.99	12.32	6.13	6.47	7.32	8.17	9.03
55	8.09	9.67	10.79	12.10	6.02	6.34	7.18	8.03	8.86
56	7.95	9.50	10.60	11.88	5.91	6.23	7.05	7.88	8.70
57	7.82	9.33	10.42	11.68	5.81	6.13	6.93	7.74	8.56
58	7 68	9.17	10.23	11.48	5.72	6.02	6.82	7.61	8.41
59	7.54	9.02	10.07	11.28	5.62	5.92	6.69	7.48	8.27
60	7 42	8.86	9.89	11.09	5.52	5.82	6.59	7.36	8.12
61	7.30	8.72	9.73	10.91	5.43	5.73	6.47	7.24	7.98
62	7.18	8.57	9.57	10.73	5.34	5.63	6.37	7.13	7.86
63	7.06	8.44	9.42	10.57	5.26	5.54	6.27	7 01	7.74
64	6.96	8.31	9.27	10.40	5.18	5.46	6.17	6.89	7.62
65	6.85	8.18	9.13	10.24	5.09	5.37	6.08	6.78	7.49
66	6 74	8.05	8.98	10.09	5.02	5.28	5.98	6.68	7.38
67	6.64	7.94	8.86	9.93	4.94	5.22	5.90	6.59	7.27

BAND DRIVEN
RING SPINNING FRAME TWIST TABLE
$1\frac{1}{16}$ IN. DIA. FRONT ROLL. 7 IN. DIA. CYLINDER.
FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, $\frac{15}{16}$" Dia. Ratio Whirl to Cylinder, 6.706					Whirl on Spindle, 1" Dia. Ratio Whirl to Cyl., 6.333			
	Jack 76 Cyl. 21	Jack 72 Cyl. 17	Jack 106 Cyl. 21	Jack 86 Cyl. 17	Jack 106 Cyl. 17	Jack 76 Cyl. 21	Jack 72 Cyl. 17	Jack 86 Cyl. 17	Jack 96 Cyl. 17
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	24.43	28.59	34.08	34.15	42.09	23.08	27.01	32.26	36.01
26	23.50	27.49	32.77	32.84	40.48	22.21	25.98	31.01	34.66
27	22.63	26.47	31.56	31.62	38.96	21.39	25.00	29.86	33.39
28	21.82	25.53	30.43	30.49	37.58	20.62	24.11	28.80	32.19
29	21.07	24.65	29.38	29.44	36.28	19.90	23.26	27.81	31.06
30	20.36	23.83	28.40	28.46	35.08	19.25	22.51	26.90	30.02
31	19.71	23.06	27.48	27.54	33.93	18.62	21.79	26.01	29.07
32	19.09	22.34	26.63	26.68	32.88	18.04	21.09	25.20	28.17
33	18.51	21.66	25.82	25.87	31.86	17.49	20.45	24.43	27.30
34	17.97	21.02	25.06	25.11	30.95	16.97	19.85	23.72	26.50
35	17.45	20.42	24.34	24.39	30.07	16.49	19.29	23.04	25.75
36	16.97	19.86	23.67	23.72	29.24	16.03	18.76	22.40	25.01
37	16.51	19.32	23.03	23.08	28.43	15.60	18.24	21.80	24.35
38	16.08	18.81	22.42	22.47	27.69	15.19	17.77	21.22	23.71
39	15.66	18.33	21.85	21.89	26.99	14.80	17.32	20.68	23.11
40	15.27	17.87	21.30	21.35	26.31	14.42	16.88	20.16	22.50
41	14.90	17.43	20.78	20.82	25.67	14.08	16.47	19.67	21.98
42	14.55	17.02	20.29	20.33	25.05	13.73	16.07	19.20	21.45
43	14.21	16.62	19.81	19.86	24.46	13.42	15.70	18.76	20.96
44	13.88	16.25	19.36	19.40	23.93	13.12	15.34	18.32	20.48
45	13.58	15.88	18.93	18.97	23.40	12.82	15.00	17.92	20.02
46	13.28	15.54	18.52	18.56	22.87	12.54	14.68	17.53	19.58
47	12.98	15.21	18.13	18.17	22.40	12.28	14.37	17.16	19.17
48	12.73	14.89	17.75	17.79	21.95	12.02	14.07	16.80	18.77
49	12.47	14.59	17.39	17.42	21.47	11.78	13.78	16.46	18.38
50	12.21	14.30	17.04	17.08	21.05	11.54	13.50	16.13	18.00
51	11.98	14.02	16.71	16.74	20.62	11.31	13.23	15.81	17.67
52	11.75	13.75	16.39	16.42	20.23	11.10	12.98	15.51	17.32
53	11.53	13.49	16.08	16.11	19.87	10.89	12.73	15.21	16.98
54	11.31	13.24	15.78	15.81	19.49	10.69	12.50	14.93	16.68
55	11.11	13.00	15.49	15.52	19.13	10.49	12.28	14.67	16.38
56	10.91	12.76	15.21	15.25	18.79	10.32	12.05	14.40	16.09
57	10.72	12.54	14.95	14.98	18.47	10.12	11.83	14.14	15.80
58	10.53	12.32	14.69	14.72	18.15	9.96	11.63	13.90	15.53
59	10.35	12.12	14.44	14.47	17.84	9.78	11.45	13.67	15.27
60	10.18	11.91	14.20	14.23	17.54	9.62	11.25	13.44	15.00
61	10.01	11.72	13.97	14.00	17.26	9.47	11.07	13.22	14.77
62	9.85	11.53	13.74	13.77	16.98	9.32	10.88	13.00	14.53
63	9.70	11.35	13.52	13.55	16.71	9.17	10.72	12.80	14.30
64	9.55	11.17	13.31	13.34	16.47	9.02	10.55	12.60	14.07
65	9.40	11.00	13.11	13.14	16.19	8.88	10.38	12.40	13.87
66	9.26	10.83	12.91	12.94	15.95	8.75	10.23	12.22	13.65
67	9.12	10.67	12.72	12.75	15.71	8.61	10.08	12.04	13.41

BAND DRIVEN
RING SPINNING FRAME, TWIST CONSTANTS.
1 IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER.
FRONT ROLL GEAR, 84 T.

Whirl on Spindle, ¾" Dia. Ratio Whirl to Cylinder, 9.286

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	1051.57	72	29	616.44
76	17	1109.99	76	29	650.69
86	17	1256.05	86	29	736.30
96	17	1402.10	96	29	821.92
106	17	1548.15	106	29	907.54
72	21	851.28	72	39	458.38
76	21	898.57	76	39	483.84
86	21	1016.80	86	39	547.51
96	21	1135.04	96	39	611.17
106	21	1253.27	106	39	674.84

Whirl on Spindle, 13/16" Dia. Ratio Whirl to Cylinder, 8.667

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	981.44	72	29	575.33
76	17	1036.07	76	29	607.29
86	17	1172.28	86	29	687.20
96	17	1308.59	96	29	767.11
106	17	1444.90	106	29	847.02
72	21	794.50	72	39	427.80
76	21	838.64	76	39	451.56
86	21	948.99	86	39	510.09
96	21	1059.34	96	39	570.41
106	21	1169.68	106	39	629.80

Whirl on Spindle, 7/8" Dia. Ratio Whirl to Cylinder, 8.125

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	920.10	72	29	539.37
76	17	971.22	76	29	569.33
86	17	1099.01	86	29	644.25
96	17	1226.80	96	29	719.16
106	17	1354.53	106	29	794.07
72	21	744.84	72	39	401.07
76	21	786.22	76	39	423.35
86	21	889.67	86	39	480.16
96	21	993.12	96	39	534.76
106	21	1096.58	106	39	590.46

BAND DRIVEN
RING SPINNING FRAME, TWIST CONSTANTS.
1 IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER
FRONT ROLL GEAR. 84 T.

Whirl on Spindle, $\frac{5}{16}$" Dia. Ratio Whirl to Cylinder, 7.647

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	865.97	72	29	507.64
76	17	914.08	76	29	535.84
86	17	1034.36	86	29	606.34
96	17	1154.63	96	29	676.85
106	17	1274.90	106	29	747.35
72	21	700.99	72	39	377.47
76	21	739.94	76	39	398.45
86	21	837.30	86	39	450.87
96	21	934.66	96	39	503.30
106	21	1032.02	106	39	555.73

Whirl on Spindle, 1" Dia. Ratio Whirl to Cylinder, 7.222+

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	817.85	72	29	479.43
76	17	863.28	76	29	506.06
86	17	976.88	86	29	572.65
96	17	1090.46	96	29	639.24
106	17	1204.05	106	29	705.83
72	21	662.04	72	39	356.47
76	21	698.82	76	39	376.28
86	21	790.77	86	39	425.79
96	21	882.72	96	39	475.30
106	21	974.67	106	39	524.81

Whirl on Spindle, $1\frac{1}{16}$" Dia. Ratio Whirl to Cylinder, 6.842

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	774.79	72	29	454.20
76	17	817.84	76	29	479.41
86	17	925.45	86	29	542.49
96	17	1033.06	96	29	605.57
106	17	1140.67	106	29	668.66
72	21	627.23	72	39	337.74
76	21	662.07	76	39	356.50
86	21	749.19	86	39	403.41
96	21	836.30	96	39	450.32
106	21	923.42	106	39	497.22

BAND DRIVEN
RING SPINNING FRAME, TWIST CONSTANTS.
1 1/16 IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER
FRONT ROLL GEAR, 84 T.

Whirl on Spindle, 3/4" Dia. Ratio Whirl to Cylinder, 9.286

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	989.72	72	29	580.19
76	17	1044.72	76	29	612.42
86	17	1182.18	86	29	693.00
96	17	1319.64	96	29	773.58
106	17	1457.11	106	29	854.17
72	21	801.21	72	39	431.42
76	21	845.72	76	39	455.39
86	21	957.00	86	39	515.31
96	21	1068.28	96	39	575.23
106	21	1179.56	106	39	635.15

Whirl on Spindle, 15/16" Dia. Ratio Whirl to Cylinder, 8.667

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	923.73	72	29	541.49
76	17	975.04	76	29	571.58
86	17	1103.33	86	29	646.79
96	17	1231.63	96	29	721.99
106	17	1359.93	106	29	797.20
72	21	747.78	72	39	402.65
76	21	789.32	76	39	425.02
86	21	893.18	86	39	480.94
96	21	997.04	96	39	536.87
106	21	1100.90	106	39	592.79

Whirl on Spindle, 7/8" Dia. Ratio Whirl to Cylinder, 8.125

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	865.99	72	29	507.65
76	17	914.10	76	29	535.85
86	17	1034.38	86	29	606.36
96	17	1154.66	96	29	676.87
106	17	1274.93	106	29	747.37
72	21	701.04	72	39	377.48
76	21	739.82	76	39	398.45
86	21	837.35	86	39	450.88
96	21	934.72	96	39	503.31
106	21	1032.03	106	39	555.74

BAND DRIVEN
RING SPINNING FRAME, TWIST CONSTANTS.
$1\frac{1}{16}$ IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER.
FRONT ROLL GEAR, 84 T.

Whirl on Spindle, $\frac{15}{16}$" Dia. Ratio Whirl to Cylinder, 7.647

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	815.04	72	29	477.79
76	17	860.32	76	29	501.34
86	17	973.52	86	29	570.70
96	17	1086.72	96	29	637.06
106	17	1199.92	106	29	703.42
72	21	659.80	72	39	355.28
76	21	696.46	76	39	375.01
86	21	788.10	86	39	424.36
96	21	879.73	96	39	473.70
106	21	971.37	106	39	523.05

Whirl on Spindle, 1" Dia. Ratio Whirl to Cylinder, 7.222+

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	769.68	72	29	451.22
76	17	812.44	76	29	476.29
86	17	919.34	86	29	538.96
96	17	1026.24	96	29	601.63
106	17	1133.14	106	29	664.30
72	21	623.16	72	39	335.52
76	21	657.78	76	39	354.16
86	21	744.33	86	39	400.76
96	21	830.88	96	39	447.36
106	21	917.43	106	39	493.96

Whirl on Spindle, $1\frac{1}{16}$" Dia. Ratio Whirl to Cylinder, 6.842

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	729.22	72	29	427.48
76	17	769.73	76	29	451.23
86	17	871.01	86	29	510.60
96	17	972.29	96	29	569.97
106	17	1073.57	106	29	629.35
72	21	590.34	72	39	317.88
76	21	623.12	76	39	335.54
86	21	705.11	86	39	379.69
96	21	787.10	96	39	423.84
106	21	869.09	106	39	467.99

BAND DRIVEN
RING SPINNING FRAME, TWIST CONSTANTS.
1⅛ IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER
FRONT ROLL GEAR, 84 T.

Whirl on Spindle, ¾" Dia. Ratio Whirl to Cylinder, 9.286

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	934.73	72	29	547.95
76	17	986.66	76	29	578.39
86	17	1116.49	86	29	654.49
96	17	1246.31	96	29	730.60
106	17	1376.14	106	29	806.70
72	21	756.69	72	39	407.45
76	21	798.73	76	39	430.08
86	21	903.82	86	39	486.67
96	21	1008.92	96	39	543.26
106	21	1114.02	106	39	599.85

Whirl on Spindle, 13/16" Dia. Ratio Whirl to Cylinder, 8.667

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	872.40	72	29	511.40
76	17	920.86	76	29	539.82
86	17	1042.03	86	29	610.84
96	17	1163.19	96	29	681.87
106	17	1284.36	106	29	752.90
72	21	706.22	72	39	380.28
76	21	745.46	76	39	401.40
86	21	843.54	86	39	454.22
96	21	941.63	96	39	507.03
166	21	1039.72	106	39	559.85

Whirl on Spindle, ⅞" Dia. Ratio Whirl to Cylinder, 8.125

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	817.87	72	29	479.44
76	17	863.30	76	29	506.08
86	17	976.90	86	29	572.66
96	17	1090.49	96	29	639.25
106	17	1204.08	106	29	705.84
72	21	662.08	72	39	356.51
76	21	698.87	76	39	376.31
86	21	790.82	86	39	425.83
96	21	882.78	96	39	475.34
106	21	974.73	106	39	524.86

BAND DRIVEN

RING SPINNING FRAME, TWIST CONSTANTS.

1⅛ IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER.

FRONT ROLL GEAR, 84 T.

Whirl on Spindle, 15/16" Dia Ratio Whirl to Cylinder, 7.647

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	769.68	72	29	451.22
76	17	812.44	76	29	476.29
86	17	919.34	86	29	538.96
96	17	1026.24	96	29	601.63
106	17	1133.14	106	29	664.30
72	21	623.16	72	39	335.58
76	21	657.78	76	39	354.22
86	21	744.33	86	39	400.83
96	21	830.88	96	39	447.44
106	21	917.43	106	39	494.04

Whirl on Spindle, 1" Dia. Ratio Whirl to Cylinder, 7.222+

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	726.98	72	29	426.17
76	17	767.37	76	29	449.84
86	17	868.34	86	29	509.03
96	17	969.31	96	29	568.22
106	17	1070.28	106	29	627.41
72	21	588.52	72	39	316.89
76	21	621.22	76	39	334.50
86	21	702.96	86	39	378.51
96	21	781.70	96	39	422.52
106	21	866.44	106	39	466.54

Whirl on Spindle, 1 1/16" Dia. Ratio Whirl to Cylinder, 6.842

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	688.72	72	29	403.73
76	17	726.98	76	29	426.16
86	17	822.64	86	29	482.23
96	17	918.29	96	29	538.30
106	17	1013.94	106	29	594.38
72	21	557.53	72	39	300.21
76	21	588.51	76	39	316.89
86	21	665.95	86	39	358.59
96	21	743.38	96	39	400.28
106	21	820.81	106	39	441.98

BAND DRIVEN

RING SPINNING FRAME TWIST TABLE.

1 IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, ¾" Dia. Ratio Whirl to Cylinder, 9.286								
	Jack 72 Cyl. 17	Jack 86 Cyl. 17	Jack 96 Cyl. 17	Jack 106 Cyl. 17	Jack 72 Cyl. 21	Jack 76 Cyl. 21	Jack 86 Cyl. 21	Jack 96 Cyl. 21	Jack 106 Cyl. 21
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	42.07	50.24	56.08	61.93	34.05	35.94	40.67	45.40	50.13
26	40.45	48.31	53.93	59.54	32.74	34.56	39.11	43.66	48.20
27	38.95	46.52	51.93	57.34	31.53	33.28	37.66	42.04	46.42
28	37.56	44.86	50.08	55.29	30.40	32.09	36.31	40.54	44.76
29	36.26	43.31	48.35	53.38	29.35	30.99	35.06	39.14	43.22
30	35.05	41.87	46.74	51.61	28.38	29.95	33.89	37.83	41.78
31	33.92	40.52	45.23	49.94	27.46	28.99	32.80	36.61	40.43
32	32.86	39.25	43.82	48.38	26.60	28.08	31.78	35.47	39.16
33	31.87	38.06	42.49	46.91	25.80	27.23	30.81	34.39	37.98
34	30.93	36.94	41.24	45.53	25.04	26.43	29.91	33.38	36.86
35	30.05	35.89	40.06	44.23	24.32	25.67	29.05	32.43	35.81
36	29.21	34.89	38.95	43.00	23.65	24.96	28.24	31.53	34.81
37	28.42	33.95	37.89	41.84	23.01	24.29	27.48	30.68	33.87
38	27.67	33.05	36.90	40.74	22.40	23.65	26.76	29.87	32.98
39	26.96	32.21	35.95	39.70	21.83	23.04	26.07	29.10	32.14
40	26.29	31.40	35.05	38.70	21.28	22.46	25.42	28.38	31.33
41	25.65	30.64	34.20	37.76	20.76	21.92	24.80	27.68	30.57
42	25.04	29.91	33.38	36.86	20.27	21.39	24.21	27.02	29.84
43	24.46	29.21	32.61	36.00	19.80	20.90	23.65	26.40	29.15
44	23.90	28.55	31.87	35.19	19.35	20.42	23.11	25.80	28.48
45	23.37	27.91	31.16	34.40	18.92	19.97	22.60	25.22	27.85
46	22.86	27.31	30.48	33.66	18.51	19.53	22.10	24.67	27.24
47	22.37	26.72	29.83	32.94	18.11	19.12	21.63	24.15	26.67
48	21.91	26.17	29.21	32.25	17.73	18.72	21.18	23.65	26.11
49	21.46	25.63	28.61	31.59	17.37	18.34	20.75	23.16	25.58
50	21.03	25.12	28.04	30.96	17.03	17.97	20.34	22.70	25.07
51	20.62	24.63	27.49	30.36	16.69	17.62	19.94	22.26	24.57
52	20.22	24.15	26.96	29.77	16.37	17.28	19.55	21.83	24.10
53	19.84	23.70	26.45	29.21	16.06	16.95	19.18	21.42	23.65
54	19.47	23.26	25.96	28.67	15.76	16.64	18.83	21.02	23.21
55	19.12	22.84	25.49	28.15	15.48	16.34	18.49	20.64	22.79
56	18.78	22.43	25.04	27.65	15.20	16.05	18.16	20.27	22.38
57	18.45	22.04	24.60	27.16	14.93	15.76	17.84	19.91	21.99
58	18.13	21.66	24.17	26.69	14.68	15.49	17.53	19.57	21.61
59	17.82	21.29	23.76	26.24	14.43	15.23	17.23	19.24	21.24
60	17.53	20.93	23.37	25.80	14.19	14.98	16.95	18.92	20.89
61	17.24	20.59	22.99	25.38	13.96	14.73	16.71	18.61	20.55
62	16.96	20.26	22.61	24.97	13.73	14.49	16.40	18.31	20.21
63	16.69	19.94	22.26	24.57	13.51	14.26	16.14	18.02	19.89
64	16.43	19.63	21.91	24.19	13.30	14.04	15.89	17.74	19.58
65	16.18	19.32	21.57	23.82	13.10	13.82	15.64	17.46	19.28
66	15.93	19.03	21.24	23.46	12.90	13.61	15.41	17.20	18.99
67	15.70	18.75	20.93	23.11	12.71	13.41	15.18	16.94	18.71

BAND DRIVEN

RING SPINNING FRAME TWIST TABLE.

1 IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER

FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, 13/16" dia. Ratio Whirl to Cylinder, 8.667								
	Jack 72 Cyl. 17	Jack 86 Cyl. 17	Jack 96 Cyl. 17	Jack 106 Cyl. 17	Jack 72 Cyl. 21	Jack 76 Cyl. 21	Jack 86 Cyl. 21	Jack 96 Cyl. 21	Jack 106 Cyl. 21
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	39.27	46.89	52.34	57.80	31.78	33.15	37.96	42.37	46.79
26	37.75	45.09	50.33	55.57	30.56	32.26	36.50	40.74	44.99
27	36.35	43.42	48.47	53.52	29.43	31.06	35.15	39.23	43.32
28	35.05	41.87	46.74	51.60	28.38	29.95	33.89	37.83	41.77
29	33.84	40.42	45.12	49.82	27.40	28.92	32.72	36.53	40.33
30	32.72	39.07	43.62	48.16	26.48	27.95	31.63	35.31	38.99
31	31.66	37.81	42.21	46.61	25.63	27.05	30.61	34.17	37.73
32	30.67	36.63	40.89	45.15	24.83	26.21	29.66	33.10	36.55
33	29.74	35.52	39.65	43.78	24.08	25.41	28.76	32.10	35.44
34	28.87	34.48	38.48	42.49	23.37	24.67	27.91	31.16	34.40
35	28.04	33.49	37.38	41.28	22.70	23.96	27.11	30.27	33.42
36	27.26	32.58	36.35	40.14	22.07	23.30	26.36	29.43	32.49
37	26.53	31.68	35.37	39.05	21.47	22.67	25.65	28.63	31.61
38	25.83	30.85	34.44	38.02	20.91	22.07	24.97	27.88	30.77
39	25.17	30.06	33.55	37.05	20.37	21.50	24.33	27.16	29.99
40	24.54	29.31	32.71	36.12	19.86	20.97	23.72	26.48	29.24
41	23.94	28.58	31.92	35.24	19.38	20.46	23.15	25.84	28.53
42	23.37	27.91	31.15	34.40	18.92	19.97	22.59	25.22	27.85
43	22.82	27.26	30.43	33.60	18.48	19.50	22.07	24.64	27.20
44	22.31	26.64	29.74	32.84	18.06	19.06	21.57	24.07	26.58
45	21.81	26.05	29.08	32.11	17.66	18.64	21.09	23.54	25.99
46	21.34	25.48	28.45	31.41	17.27	18.23	20.63	23.03	25.43
47	20.88	24.94	27.84	30.74	16.90	17.84	20.19	22.54	24.89
48	20.45	24.42	27.47	30.10	16.55	17.47	19.77	22.07	24.37
49	20.03	23.92	26.70	29.49	16.22	17.11	19.37	21.62	23.87
50	19.63	23.45	26.17	28.90	15.89	16.77	18.98	21.19	23.39
51	19.24	22.98	25.66	28.33	15.58	16.44	18.61	20.77	22.94
52	18.87	22.54	25.16	27.79	15.28	16.13	18.25	20.37	22.49
53	18.52	22.12	24.69	27.26	14.99	15.82	17.90	19.99	22.07
54	18.17	21.71	24.23	26.76	14.71	15.53	17.57	19.62	21.66
55	17.84	21.31	23.79	26.27	14.45	15.25	17.25	19.26	21.27
56	17.53	20.93	23.37	25.80	14.19	14.98	16.95	18.92	20.89
57	17.22	20.57	22.96	25.35	13.94	14.71	16.65	18.58	20.52
58	16.92	20.21	22.56	24.91	13.69	14.46	16.36	18.26	20.17
59	16.63	19.87	22.18	24.49	13.46	14.21	16.08	17.96	19.83
60	16.36	19.54	21.81	24.08	13.24	13.98	15.81	17.65	19.50
61	16.09	19.22	21.45	23.69	13.02	13.75	15.56	17.36	19.18
62	15.83	18.91	21.11	23.30	12.81	13.53	15.31	17.09	18.87
63	15.58	18.61	20.77	22.93	12.61	13.31	15.06	16.81	18.57
64	15.34	18.32	20.45	22.58	12.41	13.10	14.83	16.55	18.28
65	15.10	18.03	20.13	22.23	12.22	12.90	14.60	16.30	17.99
66	14.87	17.76	19.83	21.89	12.04	12.71	14.38	16.05	17.72
67	14.65	17.49	19.53	21.57	11.86	12.52	14.16	15.81	17.46

BAND DRIVEN

RING SPINNING FRAME TWIST TABLE.

1 IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER.

FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, $\frac{5}{16}$" dia. Ratio Whirl to Cylinder 8.667								
	Jack 72 Cyl. 29	Jack 76 Cyl. 29	Jack 86 Cyl. 29	Jack 96 Cyl. 29	Jack 106 Cyl. 29	Jack 72 Cyl. 39	Jack 76 Cyl. 39	Jack 86 Cyl. 39	Jack 96 Cyl. 39
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	23.01	24.29	27.49	30.68	33.88	17.11	18.06	20.44	22.82
26	22.09	23.36	26.43	29.50	32.58	16.45	17.37	19.65	21.94
27	21.31	22.53	25.45	28.41	31.37	15.84	16.73	18.93	21.13
28	20.55	21.69	24.54	27.40	30.25	15.28	16.13	18.25	20.37
29	19.81	20.94	23.70	26.45	29.21	14.75	15.57	17.62	19.67
30	19.18	20.24	22.91	25.57	28.23	14.26	15.05	17.03	19.01
31	18.56	19.59	22.17	24.75	27.32	13.80	14.57	16.48	18.40
32	17.98	18.98	21.47	23.97	26.47	13.37	14.11	15.97	17.83
33	17.43	18.40	20.82	23.25	25.67	12.96	13.68	15.18	17.29
34	16.92	17.86	20.21	22.56	24.92	12.58	13.28	15.03	16.78
35	16.41	17.35	19.63	21.92	24.20	12.22	12.90	14.60	16.30
36	15.98	16.87	19.09	21.31	23.53	11.88	12.54	14.19	15.84
37	15.55	16.41	18.57	20.73	22.89	11.56	12.20	13.81	15.42
38	15.14	15.98	18.08	20.19	22.29	11.26	11.88	13.45	15.01
39	14.75	15.57	17.62	19.67	21.72	10.97	11.58	13.10	14.63
40	14.38	15.18	17.18	19.18	21.18	10.70	11.29	12.75	14.26
41	14.03	14.81	16.76	18.71	20.66	10.43	11.01	12.46	13.91
42	13.70	14.46	16.36	18.26	20.17	10.19	10.75	12.17	13.58
43	13.38	14.12	15.98	17.84	19.70	9.95	10.50	11.88	13.27
44	13.08	13.80	15.62	17.43	19.25	9.72	10.26	11.61	12.97
45	12.79	13.50	15.27	17.05	18.82	9.51	10.04	11.36	12.68
46	12.51	13.20	14.94	16.68	18.41	9.30	9.82	11.11	12.40
47	12.24	12.92	14.62	16.32	18.02	9.10	9.61	10.87	12.14
48	11.99	12.65	14.32	15.98	17.65	8.91	9.41	10.65	11.88
49	11.74	12.40	14.02	15.66	17.29	8.73	9.22	10.43	11.64
50	11.51	12.15	13.74	15.34	16.94	8.56	9.03	10.22	11.41
51	11.28	11.91	13.47	15.04	16.61	8.39	8.85	10.02	11.18
52	11.06	11.68	13.21	14.75	16.29	8.23	8.68	9.83	10.97
53	10.86	11.46	12.97	14.47	15.98	8.07	8.52	9.64	10.76
54	10.65	11.25	12.73	14.21	15.68	7.92	8.36	9.46	10.56
55	10.46	11.04	12.49	13.95	15.40	7.78	8.21	9.29	10.37
56	10.27	10.84	12.27	13.70	15.13	7.64	8.06	9.13	10.19
57	10.09	10.65	12.06	13.46	14.86	7.51	7.92	8.96	10.01
58	9.92	10.47	11.85	13.23	14.60	7.38	7.79	8.81	9.84
59	9.75	10.29	11.65	13.00	14.36	7.25	7.65	8.66	9.67
60	9.59	10.12	11.45	12.79	14.12	7.13	7.53	8.52	9.51
61	9.43	9.96	11.27	12.58	13.89	7.01	7.40	8.38	9.35
62	9.28	9.79	11.08	12.37	13.66	6.90	7.28	8.24	9.20
63	9.13	9.64	10.91	12.18	13.44	6.79	7.17	8.11	9.06
64	8.99	9.49	10.74	11.99	13.23	6.68	7.06	7.98	8.91
65	8.85	9.34	10.57	11.80	13.03	6.58	6.95	7.86	8.78
66	8.72	9.20	10.41	11.62	12.83	6.48	6.84	7.74	8.64
67	8.59	9.06	10.26	11.45	12.64	6.39	6.74	7.63	8.51

BAND DRIVEN

RING SPINNING FRAME TWIST TABLE.

1 IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER

FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, 7/8" Dia. Ratio Whirl to Cylinder, 8.125								
	Jack 96 Cyl. 17	Jack 72 Cyl. 21	Jack 76 Cyl. 21	Jack 86 Cyl. 21	Jack 96 Cyl. 21	Jack 72 Cyl. 29	Jack 86 Cyl. 29	Jack 72 Cyl. 39	Jack 86 Cyl. 39
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	49.07	29.79	31.45	35.59	39.72	21.58	25.77	16.04	19.21
26	47.18	28.64	30.24	34.22	38.20	20.74	24.78	15.43	18.47
27	45.44	27.59	29.12	32.95	36.78	19.98	23.86	14.85	17.78
28	43.81	26.60	28.08	31.77	35.47	19.26	23.01	14.32	17.15
29	42.30	25.69	27.11	30.67	34.25	18.60	22.22	13.83	16.56
30	40.89	24.83	26.21	29.66	33.10	17.98	21.47	13.33	16.00
31	39.57	24.02	25.36	28.70	32.04	17.40	20.78	12.94	15.49
32	38.34	23.27	24.57	27.80	31.04	16.86	20.13	12.53	15.00
33	37.18	22.57	23.82	26.96	30.09	16.34	19.52	12.15	14.55
34	36.08	21.91	23.12	26.17	29.21	15.86	18.95	11.83	14.15
35	35.05	21.28	22.46	25.42	28.37	15.31	18.41	11.46	13.72
36	34.08	20.69	21.84	24.71	27.59	14.98	17.90	11.14	13.34
37	33.16	20.13	21.25	24.05	26.84	14.58	17.41	10.84	12.98
38	32.28	19.60	20.69	23.41	26.13	14.19	16.95	10.55	12.64
39	31.46	19.10	20.16	22.81	25.46	13.83	16.52	10.28	12.31
40	30.67	18.62	19.66	22.24	24.83	13.48	16.11	10.03	12.00
41	29.92	18.17	19.18	21.70	24.22	13.16	15.71	9.78	11.71
42	29.21	17.73	18.72	21.18	23.65	12.84	15.34	9.55	11.43
43	28.53	17.32	18.28	20.69	23.10	12.54	14.98	9.33	11.17
44	27.88	16.93	17.87	20.22	22.57	12.26	14.64	9.11	10.91
45	27.26	16.55	17.47	19.77	22.07	11.99	14.32	8.91	10.67
46	26.67	16.19	17.09	19.34	21.59	11.73	14.01	8.72	10.44
47	26.10	15.85	16.73	18.93	21.13	11.48	13.71	8.53	10.22
48	25.56	15.52	16.38	18.53	20.69	11.24	13.42	8.36	10.00
49	25.04	15.20	16.05	18.16	20.27	11.01	13.15	8.19	9.80
50	24.54	14.90	15.72	17.79	19.86	10.79	12.89	8.02	9.60
51	24.05	14.60	15.42	17.44	19.47	10.58	12.63	7.86	9.41
52	23.59	14.32	15.12	17.11	19.10	10.37	12.39	7.71	9.23
53	23.15	14.05	14.83	16.79	18.74	10.18	12.16	7.57	9.06
54	22.72	13.79	14.56	16.48	18.39	9.99	11.93	7.43	8.89
55	22.31	13.54	14.29	16.10	18.06	9.81	11.71	7.29	8.73
56	21.91	13.30	14.04	15.89	17.72	9.65	11.50	7.16	8.57
57	21.52	13.07	13.79	15.61	17.42	9.46	11.30	7.04	8.42
58	21.15	12.84	13.56	15.34	17.12	9.30	11.11	6.92	8.28
59	20.79	12.62	13.33	15.08	16.83	9.14	10.93	6.80	8.14
60	20.45	12.41	13.10	14.83	16.55	8.99	10.74	6.68	8.00
61	20.10	12.21	12.89	14.58	16.28	8.84	10.56	6.58	7.87
62	19.79	12.01	12.68	14.35	16.02	8.70	10.39	6.47	7.74
63	19.47	11.82	12.48	14.12	15.75	8.56	10.23	6.37	7.62
64	19.17	11.64	12.28	13.90	15.52	8.43	10.07	6.27	7.50
65	18.87	11.46	12.10	13.67	15.28	8.30	9.91	6.17	7.39
66	18.59	11.29	11.91	13.48	15.05	8.17	9.76	6.08	7.28
67	18.31	11.12	11.73	13.28	14.82	8.05	9.62	5.99	7.17

BAND DRIVEN

RING SPINNING FRAME TWIST TABLE.

1 IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER

FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, 15/16" dia. Ratio Whirl to Cylinder, 7.617								
	Jack 72 Cyl. 17	Jack 86 Cyl. 17	Jack 96 Cyl. 17	Jack 106 Cyl. 17	Jack 72 Cyl. 21	Jack 76 Cyl. 21	Jack 86 Cyl. 21	Jack 96 Cyl. 21	Jack 106 Cyl. 21
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	34.64	41.37	46.19	51.00	28.04	29.60	33.49	37.39	41.28
26	33.31	39.78	44.41	49.03	26.96	28.46	32.20	35.95	39.69
27	32.07	38.31	42.76	47.22	25.96	27.41	31.01	34.62	38.22
28	30.93	36.94	41.24	45.53	25.01	26.43	29.90	33.38	36.86
29	29.86	35.67	39.81	43.96	24.17	25.52	28.87	32.23	35.59
30	28.86	34.48	38.49	42.49	23.36	24.66	27.91	31.15	34.40
31	27.93	33.36	37.25	41.13	22.61	23.87	27.01	30.15	33.29
32	27.06	32.32	36.08	39.84	21.91	23.12	26.17	29.21	32.25
33	26.24	31.34	34.99	38.63	21.24	22.42	25.37	28.32	31.27
34	25.47	30.42	33.96	37.50	20.62	21.76	24.62	27.49	30.35
35	24.74	29.55	32.99	36.43	20.03	21.14	23.92	26.70	29.19
36	24.05	28.73	32.07	35.41	19.47	20.55	23.26	25.96	28.67
37	23.40	27.95	31.21	34.46	18.95	20.00	22.63	25.26	27.89
38	22.79	27.22	30.38	33.55	18.45	19.47	22.03	24.59	27.16
39	22.20	26.52	29.61	32.66	17.97	18.97	21.47	23.94	26.46
40	21.65	25.88	28.87	31.87	17.52	18.49	20.93	23.37	25.80
41	21.12	25.23	28.16	31.10	17.10	18.05	20.42	22.80	25.17
42	20.62	24.63	27.49	30.35	16.69	17.62	19.94	22.25	24.57
43	20.14	24.05	26.85	29.65	16.30	17.21	19.47	21.74	24.00
44	19.68	23.51	26.24	28.98	15.93	16.82	19.03	21.24	23.46
45	19.24	22.99	25.66	28.33	15.56	16.44	18.61	20.77	22.93
46	18.83	22.49	25.10	27.72	15.24	16.09	18.20	20.32	22.44
47	18.43	22.01	24.57	27.13	14.91	15.74	17.82	19.89	21.96
48	18.04	21.55	24.05	26.56	14.60	15.41	17.44	19.47	21.50
49	17.68	21.11	23.56	26.02	14.31	15.10	17.09	19.07	21.06
50	17.33	20.69	23.09	25.50	14.02	14.80	16.75	18.69	20.64
51	16.98	20.28	22.64	25.00	13.74	14.51	16.42	18.32	20.24
52	16.65	19.89	22.20	24.52	13.48	14.23	16.10	17.97	19.85
53	16.34	19.52	21.79	24.05	13.23	13.96	15.80	17.64	19.47
54	16.04	19.15	21.38	23.61	12.98	13.70	15.51	17.31	19.11
55	15.74	18.81	20.99	23.18	12.75	13.45	15.22	16.99	18.76
56	15.46	18.47	20.62	22.77	12.52	13.21	14.95	16.69	18.43
57	15.19	18.15	20.26	22.37	12.28	12.98	14.69	16.38	18.11
58	14.93	17.83	19.91	21.98	12.09	12.76	14.44	16.12	17.79
59	14.68	17.53	19.57	21.61	11.88	12.54	14.19	15.84	17.49
60	14.43	17.24	19.24	21.25	11.68	12.33	13.95	15.58	17.20
61	14.19	16.96	18.93	20.90	11.49	12.13	13.73	15.32	16.92
62	13.97	16.68	18.62	20.56	11.31	11.93	13.50	15.08	16.65
63	13.75	16.42	18.33	20.24	11.13	11.75	13.29	14.84	16.38
64	13.53	16.16	18.04	19.92	10.95	11.56	13.08	14.60	16.13
65	13.32	15.91	17.76	19.61	10.78	11.38	12.88	14.38	15.88
66	13.12	15.67	17.49	19.32	10.62	11.21	12.69	14.16	15.64
67	12.92	15.44	17.23	19.03	10.46	11.04	12.50	13.95	15.40

BAND DRIVEN

RING SPINNING FRAME TWIST TABLE.

1 IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, 1" dia. Ratio Whirl to Cylinder, 7.222+								
	Jack 72 Cyl. 17	Jack 86 Cyl. 17	Jack 96 Cyl. 17	Jack 106 Cyl. 17	Jack 72 Cyl. 21	Jack 76 Cyl. 21	Jack 86 Cyl. 21	Jack 96 Cyl. 21	Jack 106 Cyl. 21
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	32.71	39.07	43.62	48.16	26.48	27.95	31.63	35.31	38.99
26	31.46	37.57	41.94	46.31	25.46	26.92	30.41	33.95	37.49
27	30.29	36.18	40.39	44.59	24.52	25.88	29.29	32.69	36.10
28	29.21	31.89	38.94	43.00	23.65	24.96	28.24	31.53	34.81
29	28.20	33.69	37.60	41.52	22.83	24.10	27.27	30.44	33.61
30	27.26	32.56	36.35	40.13	22.07	23.29	26.36	29.42	32.49
31	26.38	31.51	35.18	38.84	21.36	22.51	25.51	28.47	31.44
32	25.56	30.53	34.08	37.63	20.69	21.81	24.71	27.59	30.46
33	24.78	29.60	33.04	36.49	20.06	21.18	23.96	26.75	29.54
34	24.05	28.73	32.07	35.41	19.47	20.55	23.26	25.96	28.67
35	23.37	27.91	31.16	34.40	18.92	19.97	22.59	25.22	27.85
36	22.72	27.13	30.29	33.45	18.39	19.41	21.97	24.52	27.07
37	22.10	26.40	29.47	32.54	17.89	18.89	21.37	23.86	26.34
38	21.52	25.71	28.70	31.69	17.42	18.39	20.81	23.20	25.65
39	20.97	25.10	27.96	30.87	16.98	17.94	20.28	22.63	24.99
40	20.45	24.42	27.24	30.10	16.56	17.47	19.77	22.07	24.37
41	19.95	23.83	26.60	29.37	16.15	17.04	19.29	21.53	23.77
42	19.47	23.26	25.96	28.67	15.76	16.64	18.83	21.02	23.20
43	19.02	22.72	25.36	28.00	15.40	16.25	18.39	20.53	22.67
44	18.59	22.20	24.78	27.36	15.05	15.88	17.97	20.06	22.15
45	18.17	21.71	24.23	26.76	14.71	15.53	17.57	19.62	21.66
46	17.78	21.24	23.71	26.18	14.39	15.19	17.19	19.19	21.19
47	17.40	20.78	23.20	25.62	14.09	14.87	16.82	18.78	20.74
48	17.04	20.35	22.72	25.08	13.79	14.56	16.47	18.39	20.31
49	16.69	19.94	22.25	24.57	13.51	14.26	16.14	18.02	19.89
50	16.36	19.54	21.81	24.08	13.24	13.98	15.82	17.65	19.49
51	16.04	19.15	21.38	23.61	12.98	13.70	15.51	17.31	19.11
52	15.73	18.79	20.97	23.15	12.73	13.44	15.21	16.98	18.74
53	15.43	18.43	20.57	22.72	12.49	13.19	14.92	16.66	18.39
54	15.15	18.09	20.19	22.30	12.26	12.94	14.64	16.35	18.05
55	14.87	17.76	19.83	21.89	12.04	12.71	14.38	16.05	17.72
56	14.60	17.44	19.47	21.50	11.82	12.48	14.12	15.76	17.40
57	14.35	17.14	19.13	21.12	11.61	12.26	13.87	15.49	17.10
58	14.10	16.84	18.80	20.76	11.41	12.05	13.63	15.22	16.80
59	13.86	16.56	18.48	20.41	11.22	11.84	13.40	14.96	16.52
60	13.63	16.28	18.17	20.07	11.03	11.65	13.18	14.71	16.24
61	13.41	16.01	17.88	19.74	10.85	11.46	12.96	14.47	15.98
62	13.19	15.76	17.59	19.42	10.68	11.27	12.75	14.24	15.72
63	12.98	15.51	17.31	19.11	10.51	11.09	12.55	14.01	15.47
64	12.78	15.26	17.04	18.81	10.34	10.92	12.36	13.79	15.23
65	12.58	15.03	16.78	18.52	10.19	10.75	12.17	13.58	14.99
66	12.39	14.80	16.52	18.24	10.03	10.59	11.98	13.37	14.77
67	12.21	14.58	16.28	17.97	9.88	10.43	11.80	13.18	14.55

BAND DRIVEN

RING SPINNING FRAME TWIST TABLE.

1 IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER.

FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, 1" dia. Ratio Whirl to Cylinder 7.222+								
	Jack 72 Cyl. 29	Jack 76 Cyl. 29	Jack 86 Cyl. 29	Jack 96 Cyl. 29	Jack 106 Cyl. 29	Jack 72 Cyl. 39	Jack 76 Cyl. 39	Jack 86 Cyl. 39	Jack 96 Cyl. 39
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	19.18	20.24	22.91	25.57	28.23	14.26	15.05	17.03	19.01
26	18.44	19.46	22.03	24.59	27.15	13.71	14.47	16.38	18.28
27	17.76	18.74	21.17	23.68	26.14	13.20	13.93	15.77	17.60
28	17.12	18.07	20.45	22.83	25.21	12.73	13.44	15.21	16.98
29	16.53	17.45	19.75	22.04	24.34	12.29	12.98	14.68	16.39
30	15.98	16.87	19.09	21.31	23.53	11.88	12.54	14.19	15.84
31	15.47	16.32	18.47	20.62	22.77	11.50	12.14	13.73	15.33
32	14.98	15.81	17.90	19.98	22.06	11.14	11.76	13.31	14.85
33	14.53	15.34	17.35	19.37	21.39	10.80	11.40	12.90	14.40
34	14.10	14.88	16.84	18.80	20.76	10.48	11.07	12.52	13.98
35	13.70	14.46	16.36	18.26	20.17	10.18	10.75	12.17	13.58
36	13.32	14.06	15.91	17.76	19.61	9.90	10.45	11.83	13.20
37	12.96	13.68	15.48	17.28	19.08	9.63	10.17	11.51	12.85
38	12.62	13.32	15.07	16.82	18.57	9.38	9.90	11.21	12.51
39	12.29	12.98	14.68	16.39	18.10	9.14	9.65	10.92	12.19
40	11.98	12.65	14.32	15.98	17.65	8.92	9.41	10.65	11.88
41	11.69	12.34	13.97	15.59	17.22	8.69	9.18	10.38	11.59
42	11.41	12.05	13.63	15.22	16.81	8.49	8.96	10.14	11.32
43	11.15	11.77	13.32	14.87	16.41	8.29	8.75	9.90	11.05
44	10.90	11.50	13.01	14.53	16.04	8.10	8.55	9.68	10.80
45	10.65	11.25	12.73	14.21	15.69	7.92	8.36	9.46	10.56
46	10.42	11.00	12.45	13.90	15.34	7.75	8.18	9.26	10.33
47	10.20	10.77	12.18	13.60	15.02	7.58	8.01	9.06	10.11
48	9.99	10.54	11.93	13.32	14.70	7.43	7.84	8.87	9.90
49	9.78	10.33	11.69	13.05	14.40	7.27	7.68	8.69	9.70
50	9.59	10.12	11.45	12.78	14.12	7.13	7.53	8.52	9.51
51	9.40	9.92	11.23	12.53	13.84	6.99	7.38	8.35	9.32
52	9.22	9.73	11.01	12.29	13.57	6.86	7.24	8.19	9.14
53	9.05	9.55	10.80	12.06	13.32	6.73	7.10	8.03	8.97
54	8.88	9.37	10.60	11.84	13.07	6.60	6.97	7.89	8.80
55	8.72	9.20	10.41	11.62	12.83	6.48	6.84	7.74	8.64
56	8.56	9.04	10.23	11.42	12.60	6.37	6.72	7.60	8.49
57	8.41	8.88	10.05	11.21	12.38	6.25	6.60	7.47	8.34
58	8.27	8.73	9.87	11.02	12.17	6.15	6.49	7.34	8.19
59	8.13	8.58	9.71	10.83	11.96	6.04	6.38	7.22	8.06
60	7.99	8.43	9.54	10.65	11.76	5.94	6.27	7.10	7.92
61	7.86	8.30	9.39	10.48	11.57	5.84	6.17	6.98	7.79
62	7.73	8.16	9.24	10.31	11.38	5.75	6.07	6.87	7.67
63	7.61	8.03	9.09	10.15	11.20	5.66	5.97	6.76	7.54
64	7.49	7.91	8.95	9.99	11.03	5.57	5.88	6.65	7.43
65	7.37	7.79	8.81	9.83	10.86	5.48	5.79	6.55	7.31
66	7.26	7.67	8.68	9.69	10.69	5.40	5.70	6.45	7.20
67	7.16	7.55	8.55	9.54	10.53	5.32	5.62	6.36	7.07

BAND DRIVEN

RING SPINNING FRAME TWIST TABLE.

1 IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER.

FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, $1^{3}/_{16}$" dia. Ratio Whirl to Cylinder 6.842								
	Jack 96 Cyl. 17	Jack 72 Cyl. 21	Jack 76 Cyl. 21	Jack 86 Cyl. 21	Jack 96 Cyl. 21	Jack 72 Cyl. 29	Jack 86 Cyl. 29	Jack 72 Cyl. 39	Jack 86 Cyl. 39
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	41.32	25.09	26.48	29.97	33.45	18.17	21.70	13.51	16.14
26	39.73	24.12	25.46	28.81	32.17	17.47	20.87	12.99	15.52
27	38.26	23.23	24.52	27.75	30.97	16.81	20.09	12.51	14.94
28	36.89	22.40	23.65	26.76	29.87	16.22	19.37	12.06	14.41
29	35.62	21.63	22.83	25.83	28.84	15.66	18.71	11.65	13.91
30	34.43	20.91	22.07	24.97	27.88	15.14	18.08	11.26	13.45
31	33.32	20.23	21.36	24.16	26.98	14.65	17.50	10.89	13.01
32	32.28	19.60	20.69	23.41	26.13	14.19	16.95	10.55	12.61
33	31.30	19.01	20.06	22.70	25.34	13.76	16.44	10.23	12.22
34	30.38	18.45	19.47	22.03	24.60	13.36	15.96	9.93	11.87
35	29.52	17.92	18.92	21.41	23.89	12.98	15.50	9.66	11.53
36	28.69	17.42	18.39	20.81	23.23	12.62	15.07	9.38	11.21
37	27.92	16.95	17.89	20.25	22.60	12.28	14.66	9.13	10.90
38	27.19	16.51	17.42	19.72	22.01	11.95	14.28	8.89	10.62
39	26.49	16.08	16.98	19.21	21.44	11.65	13.91	8.66	10.35
40	25.83	15.68	16.55	18.73	20.91	11.36	13.56	8.44	10.09
41	25.20	15.30	16.15	18.27	20.40	11.08	13.23	8.24	9.84
42	24.60	14.93	15.76	17.84	19.91	10.81	12.92	8.04	9.61
43	24.02	14.59	15.40	17.42	19.45	10.56	12.62	7.85	9.38
44	23.48	14.26	15.05	17.03	19.01	10.32	12.33	7.68	9.17
45	22.95	13.94	14.71	16.65	18.59	10.09	12.06	7.51	8.96
46	22.46	13.64	14.39	16.29	18.18	9.87	11.79	7.34	8.77
47	21.98	13.35	14.09	15.91	17.79	9.66	11.54	7.19	8.58
48	21.52	13.07	13.79	15.61	17.42	9.46	11.30	7.04	8.40
49	21.08	12.80	13.51	15.29	17.07	9.27	11.07	6.89	8.23
50	20.66	12.54	13.24	14.98	16.73	9.08	10.85	6.75	8.07
51	20.25	12.30	12.98	14.69	16.40	8.91	10.64	6.62	7.91
52	19.90	12.06	12.73	14.41	16.08	8.73	10.43	6.50	7.76
53	19.49	11.83	12.49	14.14	15.78	8.57	10.24	6.37	7.61
54	19.13	11.62	12.26	13.87	15.49	8.41	10.05	6.25	7.47
55	18.78	11.40	12.04	13.62	15.21	8.26	9.86	6.14	7.33
56	18.45	11.20	11.82	13.38	14.93	8.11	9.69	6.03	7.20
57	18.12	11.00	11.62	13.14	14.67	7.97	9.52	5.93	7.08
58	17.81	10.81	11.42	12.92	14.42	7.83	9.35	5.82	6.96
59	17.51	10.63	11.22	12.70	14.17	7.70	9.19	5.72	6.84
60	17.22	10.45	11.03	12.48	13.94	7.57	9.04	5.63	6.72
61	16.94	10.28	10.85	12.28	13.71	7.45	8.89	5.54	6.61
62	16.66	10.12	10.68	12.08	13.49	7.33	8.75	5.45	6.51
63	16.40	9.96	10.51	11.89	13.27	7.21	8.61	5.36	6.40
64	16.14	9.80	10.34	11.71	13.07	7.10	8.48	5.28	6.30
65	15.89	9.65	10.19	11.53	12.87	7.03	8.35	5.20	6.21
66	15.65	9.50	10.03	11.35	12.67	6.88	8.22	5.12	6.11
67	15.42	9.36	9.88	11.18	12.48	6.78	8.10	5.04	6.02

BAND DRIVEN

RING SPINNING FRAME TWIST TABLE.

1 1/16 IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER.

FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, 3/4" dia. Ratio Whirl to Cyl., 9.286					Whirl on Spindle, 13/16" dia. Ratio Whirl to Cyl., 8.667			
	Jack 76 Cyl. 21	Jack 72 Cyl. 17	Jack 106 Cyl. 21	Jack 86 Cyl. 17	Jack 106 Cyl. 17	Jack 76 Cyl. 21	Jack 72 Cyl. 17	Jack 86 Cyl. 17	Jack 96 Cyl. 17
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	33.83	39.59	47.18	47.29	58.28	31.57	36.95	44.13	49.27
26	32.53	38.06	45.37	45.47	56.04	30.36	35.53	42.44	47.37
27	31.32	36.66	43.69	43.78	53.97	29.23	34.21	40.86	45.62
28	30.20	35.35	42.13	42.22	52.40	28.19	32.99	39.40	43.99
29	29.16	34.13	40.67	40.76	50.25	27.22	31.85	38.05	42.47
30	28.19	32.99	39.32	39.40	48.57	26.31	30.79	36.78	41.05
31	27.28	31.93	38.05	38.13	47.00	25.46	29.80	35.59	39.73
32	26.43	30.93	36.86	36.94	45.53	24.67	28.87	34.48	38.49
33	25.63	29.99	35.74	35.82	44.15	23.92	27.99	33.43	37.32
34	24.87	29.11	34 69	34.77	42.86	23.22	27.17	32.45	36.22
35	24.16	28 28	33.70	33.78	41.63	22.55	26.39	31.52	35.19
36	23.49	27.49	32.77	32.84	40.48	21.93	25.66	30.65	34.21
37	22.86	26.75	31.88	31.95	39.38	21.33	24.97	29.82	33.29
38	22.26	26.05	31.04	31.11	38.34	20.77	24 31	29.03	32.41
39	21.68	25.38	30.24	30.31	37.36	20.24	23.69	28.29	31.58
40	21.14	24.74	29.49	29.55	36.43	19.73	23.09	27.58	30.79
41	20.63	24.14	28.77	28.83	35.54	19.25	22.53	26,91	30.04
42	20.14	23.56	28.08	28.15	34.69	18.79	21.99	26.27	29.32
43	19.67	23.02	27.43	27.49	33 89	18.36	21.48	25.66	28.64
44	19.22	22.49	26.81	26.87	33.12	17.94	20.99	25.08	27.99
45	18.79	21.99	26.21	26.27	32.38	17.54	20.53	24.52	27.37
46	18.39	21.52	25.64	25.70	31.68	17.16	20.08	23.99	26.77
47	17.99	21.06	25.10	25.15	31.00	16.79	19.65	23.48	26.20
48	17.62	20.62	24.57	24 63	30.36	16 44	19.24	22.99	25.66
49	17.26	20.20	24.07	24.13	29.74	16.11	18.85	22.52	25.13
50	16.91	19.79	23.59	23.64	29.14	15.79	18.47	22.07	24.63
51	16.58	19.41	23.13	23.18	28.57	15.48	18.11	21.63	24.15
52	16.26	19.03	22.68	22.73	28.02	15.18	17.76	21.22	23.69
53	15.96	18.67	22.26	22.30	27.49	14.89	17.43	20.82	23.24
54	15.66	18.33	21.84	21.89	26.52	14.62	17.11	20.43	22.81
55	15.38	17.99	21.45	21.49	26.49	14.35	16.80	20.06	22.39
56	15.10	17.67	21.06	21.11	26.02	14.09	16.49	19.70	21.99
57	14.84	17.36	20.69	20.74	25.56	13.85	16.21	19.36	21.61
58	14.58	17.06	20.34	20.38	25.12	13.61	15.93	19.02	21.23
59	14.33	16.77	19.99	20.04	24.70	13.38	15.66	18.70	20.88
60	14.09	16.49	19.66	19.70	24.28	13.16	15.39	18.39	20.53
61	13.86	16.22	19.34	19.38	23.89	12.94	15.14	18.09	20.19
62	13.64	15.96	19.03	19.07	23.50	12.73	14.90	17.80	19.87
63	13.42	15.71	18.72	18.76	23.13	12.53	14.66	17.51	19.55
64	13.21	15.46	18.43	18.47	22.77	12.33	14.43	17.24	19.24
65	13.01	15.23	18.15	18.19	22.42	12.14	14.21	16.97	18.95
66	12.81	14.99	17.87	17.91	22.08	11.96	14.00	16.72	18.66
67	12.62	14.77	17.61	17.64	21.75	11.78	13.79	16.47	18.38

BAND DRIVEN

RING SPINNING FRAME TWIST TABLE.

$1\frac{1}{16}$ IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER. FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, $\frac{5}{16}$" dia. Ratio Whirl to Cyl., 7.647					Whirl on Spindle, 1" dia. Ratio Whirl to Cyl., 7.222+			
	Jack 76 Cyl. 21	Jack 72 Cyl. 17	Jack 106 Cyl. 21	Jack 86 Cyl. 17	Jack 106 Cyl. 17	Jack 76 Cyl. 21	Jack 72 Cyl. 17	Jack 86 Cyl. 17	Jack 96 Cyl. 17
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	27.86	32.60	38.85	38.94	48.00	26.31	30.79	36.77	41.05
26	26.79	31.35	37.36	37.44	46.15	25.30	29.60	35.36	39.47
27	25.79	30.19	35.98	36.06	44.44	24.36	28.51	34.05	38.01
28	24.87	29.11	34.69	34.77	42.85	23.49	27.49	32.83	36.65
29	24.02	28.10	33.50	33.57	41.38	22.68	26.54	31.70	35.39
30	23.21	27.13	32.38	32.45	40.00	21.93	25.66	30.64	34.21
31	22.47	26.29	31.33	31.40	38.71	21.22	24.83	29.66	33.10
32	21.76	25.47	30.36	30.42	37.50	20.56	24.05	28.73	32.07
33	21.10	24.70	29.44	29.50	36.36	19.93	23.32	27.86	31.10
34	20.48	23.97	28.57	28.63	35.29	19.35	22.64	27.04	30.18
35	19.90	23.28	27.75	27.81	31.28	18.79	21.99	26.27	29.32
36	19.35	22.64	26.98	27.04	33.33	18.27	21.38	25.54	28.52
37	18.82	22.03	26.25	26.31	32.43	17.78	20.80	24.85	27.75
38	18.33	21.45	25.56	25.62	31.58	17.31	20.25	24.19	27.02
39	17.86	20.90	24.91	24.96	30.77	16.87	19.74	23.57	26.33
40	17.41	20.38	24.28	24.34	30.00	16.44	19.24	22.98	25.67
41	16.99	19.88	23.69	23.74	29.27	16.04	18.77	22.42	25.04
42	16.58	19.41	23.13	23.18	28.57	15.66	18.33	21.89	24.43
43	16.20	18.95	22.59	22.64	27.91	15.30	17.90	21.38	23.87
44	15.83	18.52	22.08	22.13	27.27	14.95	17.49	20.90	23.32
45	15.48	18.11	21.59	21.63	26.67	14.62	17.10	20.43	22.81
46	15.14	17.72	21.12	21.16	26.09	14.30	16.73	19.99	22.31
47	14.82	17.34	20.67	20.71	25.53	14.00	16.38	19.56	21.84
48	14.51	16.98	20.24	20.28	25.00	13.70	16.04	19.15	21.38
49	14.21	16.63	19.82	19.86	24.49	13.42	15.71	18.76	20.94
50	13.93	16.30	19.43	19.47	24.00	13.16	15.39	18.39	20.52
51	13.66	15.98	19.05	19.09	23.53	12.90	15.09	18.03	20.12
52	13.39	15.67	18.68	18.72	23.08	12.65	14.80	17.68	19.74
53	13.14	15.38	18.33	18.37	22.64	12.41	14.52	17.35	19.36
54	12.90	15.09	17.99	18.03	22.22	12.18	14.25	17.02	19.00
55	12.66	14.82	17.66	17.70	21.82	11.96	13.99	16.72	18.66
56	12.44	14.55	17.35	17.38	21.43	11.75	13.74	16.42	18.33
57	12.22	14.30	17.04	17.08	21.05	11.54	13.50	16.13	18.00
58	12.00	14.05	16.75	16.78	20.69	11.34	13.27	15.85	17.69
59	11.80	13.81	16.46	16.50	20.34	11.15	13.05	15.58	17.39
60	11.61	13.58	16.19	16.23	20.00	10.96	12.83	15.32	17.10
61	11.42	13.36	15.92	15.96	19.67	10.78	12.62	15.07	16.82
62	11.23	13.15	15.67	15.70	19.35	10.61	12.41	14.83	16.55
63	11.05	12.94	15.42	15.45	19.05	10.44	12.22	14.59	16.29
64	10.88	12.74	15.18	15.21	18.75	10.28	12.03	14.36	16.04
65	10.71	12.54	14.94	14.98	18.46	10.12	11.84	14.14	15.79
66	10.55	12.35	14.72	14.75	18.18	9.97	11.66	13.93	15.55
67	10.39	12.16	14.50	14.53	17.91	9.82	11.49	13.72	15.32

TAPE DRIVEN
RING SPINNING FRAME TWIST CONSTANTS.
1 IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER.
FRONT ROLL GEAR, 84 T.

Whirl on Spindle, 3/4" Dia. Ratio Whirl to Cylinder, 10.666

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	1207.80	72	29	708.05
76	17	1274.90	76	29	747.38
86	17	1442.65	86	29	845.72
96	17	1610.40	96	29	944.06
106	17	1778.15	106	29	1042.40
72	21	977.76	72	39	526.46
76	21	1032.08	76	39	555.71
86	21	1167.88	86	39	628.83
96	21	1303.68	96	39	701.95
106	21	1439.48	106	39	775.07

Whirl on Spindle, 13/16" Dia. Ratio Whirl to Cylinder, 9.846

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	1114.99	72	29	653.62
76	17	1176.94	76	29	689.93
86	17	1331.79	86	29	780.71
96	17	1486.66	96	29	871.49
106	17	1641.52	106	29	962.27
72	21	902.59	72	39	486.00
76	21	952.74	76	39	513.00
86	21	1078.10	86	39	580.50
96	21	1203.46	96	39	648.00
106	21	1328.82	106	39	715.50

Whirl on Spindle, 7/8" Dia. Ratio Whirl to Cylinder, 9.143

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	1036.66	72	29	606.89
76	17	1094.25	76	29	640.60
86	17	1238.23	86	29	724.89
96	17	1382.21	96	29	809.18
106	17	1526.19	106	29	893.47
72	21	838.15	72	39	451.30
76	21	881.72	76	39	476.37
86	21	1001.13	86	39	539.05
96	21	1117.54	96	39	601.73
106	21	1233.95	106	39	664.41

TAPE DRIVEN
RING SPINNING FRAME TWIST CONSTANTS.
1 IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER.
FRONT ROLL GEAR, 84 T.

Whirl on Spindle, 15/16" Dia. Ratio Whirl to Cylinder, 8.533

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	966.30	72	29	566.42
76	17	1019.99	76	29	597.89
86	17	1154.20	86	29	676.56
96	17	1288.41	96	29	755.23
106	17	1422.61	106	29	833.90
72	21	782.14	72	39	421.20
76	21	825.59	76	39	444.60
86	21	934.22	86	39	503.10
96	21	1042.85	96	39	561.60
106	21	1151.48	106	39	620.10

Whirl on Spindle, 1" Dia. Ratio Whirl to Cylinder, 8.000

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	905.90	72	29	531.07
76	17	956.23	76	29	560.58
86	17	1082.05	86	29	634.34
96	17	1207.87	96	29	708.10
106	17	1333.69	106	29	781.86
72	21	733.32	72	39	394.85
76	21	774.06	76	39	416.78
86	21	875.91	86	39	471.62
96	21	977.76	96	39	526.46
106	21	1079.61	106	39	581.30

Whirl on Spindle, 1 1/16" Dia. Ratio Whirl to Cylinder, 7.529

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	852.55	72	29	499.75
76	17	899.92	76	29	527.52
86	17	1022.33	86	29	596.93
96	17	1136.74	96	29	666.34
106	17	1255.15	106	29	735.75
72	21	690.19	72	39	371.59
76	21	728.54	76	39	392.24
86	21	824.40	86	39	443.85
96	21	920.26	96	39	495.46
106	21	1016.12	106	39	547.07

TAPE DRIVEN

RING SPINNING FRAME, TWIST CONSTANTS.

1 IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER.

FRONT ROLL GEAR, 84 T.

Whirl on Spindle, 1 1/8" Dia. Ratio Whirl to Cylinder, 7.111

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	805.32	72	29	472.17
76	17	850.01	76	29	498.41
86	17	962.01	86	29	563.82
96	17	1073.83	96	29	629.43
106	17	1185.65	106	29	695.03
72	21	652.05	72	39	351.04
76	21	688.19	76	39	370.62
86	21	778.71	86	39	419.30
96	21	869.22	96	39	468.17
106	21	959.93	106	39	516.85

TAPE DRIVEN
RING SPINNING FRAME, TWIST CONSTANTS.
$1\frac{1}{16}$ IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER.
FRONT ROLL GEAR, 84 T.

Whirl on Spindle, $\frac{3}{4}$" Dia. Ratio Whirl to Cylinder, 10.666

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	1137 10	72	29	666.58
76	17	1200 27	76	29	703.61
86	17	1358 20	86	29	796.19
96	17	1516 13	96	29	888.77
106	17	1674 06	106	29	981.35
72	21	920 52	72	39	495.65
76	21	971 66	76	39	523.18
86	21	1099.51	86	39	592.02
96	21	1227.36	96	39	660.86
106	21	1355.21	106	39	729.70

Whirl on Spindle, $\frac{13}{16}$" Dia. Ratio Whirl to Cylinder, 9.846

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	1049.69	72	29	615.31
76	17	1108.00	76	29	649.50
86	17	1253.79	86	29	734.96
96	17	1399.58	96	29	820.42
106	17	1545.37	106	29	905.88
72	21	849.74	72	39	457.56
76	21	896.95	76	39	482.98
86	21	1014.97	86	39	546.53
96	21	1132.99	96	39	610.08
106	21	1251.01	106	39	673.63

Whirl on Spindle, $\frac{7}{8}$" Dia. Ratio Whirl to Cylinder, 9.143

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	974.74	72	29	571.39
76	17	1028.89	76	29	603.14
86	17	1164.27	86	29	682.50
96	17	1299.65	96	29	761.86
106	17	1435.03	106	29	841.22
72	21	789.05	72	39	424.87
76	21	832.89	76	39	448.48
86	21	942.47	86	39	507.49
96	21	1052.06	96	39	566.50
106	21	1161.65	106	39	625.51

TAPE DRIVEN
RING SPINNING FRAME, TWIST CONSTANTS.
$1\frac{1}{16}$ IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER
FRONT ROLL GEAR, 84T.

Whirl on Spindle, $\frac{15}{16}$" Dia. Ratio Whirl to Cylinder, 8.533

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	909.72	72	29	533.23
76	17	960.26	76	29	562.86
86	17	1086.61	86	29	636.92
96	17	1212.96	96	29	710.98
106	17	1339.31	106	29	785.04
72	21	736.42	72	39	396.50
76	21	777.33	76	39	418.53
86	21	879.61	86	39	473.60
96	21	981.89	96	39	528.67
106	21	1084.17	106	39	583.74

Whirl on Spindle, 1" Dia. Ratio Whirl to Cylinder, 8.000

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	852.84	72	29	499.97
76	17	900.22	76	29	527.74
86	17	1018.67	86	29	597.18
96	17	1137.12	96	29	666.62
106	17	1255.57	106	29	736.06
72	21	690.40	72	39	371.74
76	21	728.76	76	39	392.39
86	21	824.65	86	39	444.02
96	21	920.54	96	39	495.65
106	21	1016.43	106	39	547.28

Whirl on Spindle, $1\frac{1}{16}$" Dia. Ratio Whirl to Cylinder, 7.529

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	802.66	72	29	470.52
76	17	847.25	76	29	496.66
86	17	958.73	86	29	562.01
96	17	1070.21	96	29	627.36
106	17	1181.69	106	29	692.71
72	21	649.78	72	39	349.85
76	21	685.88	76	39	369.28
86	21	776.13	86	39	417.87
96	21	866.38	96	39	466.46
106	21	956.62	106	39	515.05

TAPE DRIVEN
RING SPINNING FRAME, TWIST CONSTANTS.
1⅛ IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER
FRONT ROLL GEAR, 84 T.

Whirl on Spindle, ¾" Dia. Ratio Whirl to Cylinder, 10.666

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	1074.24	72	29	629.57
76	17	1133.69	76	29	664.54
86	17	1282.86	86	29	751.98
96	17	1432.03	96	29	839.42
106	17	1581.20	106	29	926.86
72	21	869.47	72	39	468.14
76	21	917.78	76	39	494.15
86	21	1038.54	86	39	559.17
96	21	1159.30	96	39	624.19
106	21	1280.06	106	39	689.21

Whirl on Spindle, 15/16" Dia. Ratio Whirl to Cylinder, 9.846

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	991.44	72	29	581.18
76	17	1046.52	76	29	613.47
86	17	1184.22	86	29	694.19
96	17	1321.92	96	29	774.91
106	17	1459.62	106	29	855.63
72	21	802.58	72	39	432.14
76	21	847.17	76	39	456.15
86	21	958.64	86	39	516.17
96	21	1070.11	96	39	576.19
106	21	1181.58	106	39	636.21

Whirl on Spindle, 7/8" Dia. Ratio Whirl to Cylinder, 9.1429

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	920.66	72	29	539.64
76	17	971.81	76	29	569.62
86	17	1099.68	86	29	644.57
96	17	1227.55	96	29	719.52
106	17	1355.42	106	29	794.47
72	21	745.27	72	39	401.26
76	21	786.68	76	39	423.55
86	21	890.19	86	39	479.28
96	21	993.70	96	39	535.01
106	21	1097.21	106	39	590.74

TAPE DRIVEN
RING SPINNING FRAME, TWIST CONSTANTS.
1⅛ IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER
FRONT ROLL GEAR, 84 T.

Whirl on Spindle, 15/16" Dia. Ratio Whirl to Cylinder, 8.533

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	859.25	72	29	503.64
76	17	906.98	76	29	531.62
86	17	1026.32	86	29	601.57
96	17	1145.66	96	29	671.52
106	17	1265.00	106	29	741.47
72	21	695.58	72	39	374.54
76	21	734.22	76	39	395.35
86	21	830.83	86	39	447.37
96	21	927.44	96	39	499.39
106	21	1024.04	106	39	551.41

Whirl on Spindle, 1" Dia. Ratio Whirl to Cylinder, 8.000

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	805.54	72	29	472.18
76	17	850.29	76	29	498.41
86	17	962.17	86	29	563.99
96	17	1074.05	96	29	629.57
106	17	1185.93	106	29	695.15
72	21	652.10	72	39	351.14
76	21	688.33	76	39	370.65
86	21	778.90	86	39	419.42
96	21	869.47	96	39	468.19
106	21	960.04	106	39	516.96

Whirl on Spindle, 1 1/16" Dia. Ratio Whirl to Cylinder, 7.529

Jack Gear	Cylinder Gear	Twist Constant	Jack Gear	Cylinder Gear	Twist Constant
72	17	758.09	72	29	444.38
76	17	800.20	76	29	469.07
86	17	905.49	86	29	530.79
96	17	1010.78	96	29	592.51
106	17	1116.07	106	29	654.23
72	21	613.73	72	39	330.41
76	21	647.82	76	39	348.76
86	21	733.06	86	39	394.65
96	21	818.30	96	39	440.54
106	21	903.54	106	39	486.43

TAPE DRIVEN

RING SPINNING FRAME TWIST TABLE

1 IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER. FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, $^3/_4$" Dia. Ratio Whirl to Cylinder, 10.666								
	Jack 72 Cyl. 17	Jack 86 Cyl. 17	Jack 96 Cyl. 17	Jack 106 Cyl. 17	Jack 72 Cyl. 21	Jack 76 Cyl. 21	Jack 86 Cyl. 21	Jack 96 Cyl. 21	Jack 106 Cyl. 21
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	48.31	57.71	64.42	71.13	39.11	41.28	16.71	52.15	57.58
26	46.47	55.50	61.90	68.45	37.61	39.70	44.80	50.11	55.37
27	44.73	53.43	59.60	65.90	36.22	38.21	43.21	48.26	53.35
28	43.14	51.51	57.51	63.51	34.91	36.87	41.68	46.55	51.41
29	41.70	49.80	55.52	61.41	33.71	35.59	40.25	44.95	49.64
30	40.25	48.09	53.70	59.39	32.59	34.41	38.93	43.49	47.98
31	38.95	46.54	51.95	57.40	31.52	33.30	37.64	42.07	46.47
32	37.75	45.15	50.42	55.52	30.57	32.24	36.45	40.72	45.00
33	36.60	43.75	48.81	53.85	29.63	31.26	35.38	39.52	43.62
34	35.52	42.48	47.36	52.25	28.75	30.35	34.32	38.37	42.35
35	34.50	41.20	46.01	50.80	27.92	29.51	33.35	37.25	41.08
36	33.55	40.07	44.75	49.39	27.18	28.65	32.42	36.22	39.97
37	32.63	39.00	43.52	48.01	26.42	27.90	31.54	35.24	38.89
38	31.79	38.00	42.41	46.81	25.74	27.18	30.72	34.32	37.86
39	30.97	37.00	41.38	45.59	25.09	26.46	29.93	33.41	36.89
40	30.20	36.07	40.26	44.15	24.44	25.80	29.20	32.59	35.99
41	29.47	35.20	39.32	43.11	23.83	25.19	28.48	31.80	35.09
42	28.78	34.38	38.37	12.32	23.27	24.57	27.79	31.05	34.25
43	28.09	33.57	37.48	41.37	22.75	24.00	27.17	30.32	33.45
44	27.45	32.80	36.60	40.46	22.21	23.44	26.52	29.62	32.71
45	26.86	32.09	35.80	39.55	21.72	22.92	25.92	28.98	31.97
46	26.27	31.39	35.01	38.68	21.23	22.42	25.39	28.35	31.27
47	25.70	30.70	31.28	37.83	20.80	21.95	24.81	27.74	30.60
48	25.18	30.09	33.58	37.05	20.38	21.48	21.32	27.18	29.97
49	24.65	29.44	32.88	36.30	19.94	21.06	23.80	26.60	29.38
50	24.46	28.85	32.21	35.59	19.56	20.64	23.35	26.09	28.78
51	23.69	28.30	31.60	34.86	19.16	20.24	22.88	25.57	28.20
52	23.21	27.76	30.99	34.20	18.80	19.86	22.43	25.09	27.68
53	22.80	27.22	30.40	33.55	18.44	19.47	22.00	24.60	27.16
54	22.38	26.71	29.85	32.93	18.09	19.11	21.60	24.17	26.63
55	21.98	26.22	29.28	32.35	17.77	18.78	21.21	23.72	26.18
56	21.59	25.78	28.78	31.76	17.47	18.42	20.85	23.29	25.68
57	21.20	25.31	28.26	31.19	17.14	18.10	20.49	22.85	25.22
58	20.81	24.88	27.79	30.64	16.85	17.79	20.12	22.48	24.79
59	20.47	24.44	27.33	30.11	16.57	17.49	19.78	22.09	24.39
60	20.13	24.07	26.84	29.64	16.31	17.21	19.45	21.72	23.99
61	19.80	23.64	26.40	29.14	16.02	16.92	19.13	21.38	23.59
62	19.48	23.26	26.00	27.68	15.76	16.65	18.82	21.03	23.19
63	19.18	22.90	25.57	28.23	15.52	16.38	18.52	20.69	22.81
64	18.88	22.55	25.18	27.79	15.28	16.13	18.22	20.39	22.48
65	18.59	22.20	24.79	27.37	15.04	15.88	17.95	20.08	22.15
66	18.30	21.85	24.41	26.95	14.81	15.64	17.68	19.75	21.79
67	18.03	21.53	24.04	26.54	14.59	15.40	17.43	19.46	21.48

TAPE DRIVEN

RING SPINNING FRAME, TWIST TABLE

1″ DIA. FRONT ROLL 8″ DIA. CYLINDER

FRONT ROLL GEAR, 84T

Twist Change Gear	Whirl on Spindle $\frac{3}{16}$″ Dia. Ratio Whirl to Cylinder, 9.846								
	Jack 72 Cyl. 17	Jack 86 Cyl. 17	Jack 96 Cyl. 17	Jack 106 Cyl. 17	Jack 72 Cyl. 21	Jack 76 Cyl. 21	Jack 86 Cyl. 21	Jack 96 Cyl. 21	Jack 106 Cyl. 21
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	44.60	53.27	59.47	65.66	36.10	38.11	43.12	48.14	53.15
26	42.91	51.22	57.19	63.12	34.70	36.64	41.43	46.30	51.10
27	41.30	49.32	55.09	60.79	33.42	35.26	39.93	44.55	49.20
28	39.85	47.56	53.10	58.60	32.24	34.01	38.48	43.00	47.48
29	38.46	45.92	51.23	56.55	31.14	32.84	37.18	41.49	45.81
30	37.20	44.39	49.55	54.74	30.10	31.77	35.92	40.09	44.30
31	35.98	42.96	47.91	52.95	29.12	30.72	34.73	38.80	42.90
32	34.85	41.61	46.45	51.30	28.20	29.78	33.64	37.59	41.51
33	33.80	40.36	45.04	49.71	27.34	28.87	32.62	36.46	40.27
34	32.80	39.17	43.70	48.29	26.53	28.01	31.66	35.40	39.10
35	31.87	38.05	42.47	46.90	25.78	27.21	30.78	34.39	37.98
36	30.99	36.99	41.30	45.59	25.08	26.46	29.92	33.42	36.92
37	30.17	35.99	40.17	44.37	24.39	25.75	29.14	32.53	35.94
38	29.35	35.05	39.11	43.20	23.75	25.09	28.38	31.68	34.96
39	28.60	34.15	38.10	42.08	23.15	24.41	27.62	30.87	34.08
40	27.87	33.29	37.17	41.04	22.56	23.82	26.95	30.09	33.22
41	27.20	32.48	36.23	40.01	22.00	23.21	26.28	29.38	32.41
42	26.56	31.71	35.38	39.10	21.47	22.66	25.64	28.64	31.62
43	25.94	30.97	34.56	38.18	20.98	22.17	25.05	27.99	30.90
44	25.35	30.25	33.78	37.32	20.49	21.65	24.49	27.37	30.20
45	24.79	29.60	33.05	36.47	20.04	21.18	23.96	26.78	29.54
46	24.22	28.95	32.32	35.67	19.60	20.69	23.41	26.18	28.89
47	23.72	28.34	31.62	34.92	19.19	20.25	22.92	25.60	28.28
48	23.22	27.75	30.97	34.20	18.78	19.83	22.41	25.07	27.70
49	22.75	27.18	30.33	33.48	18.40	19.42	22.00	24.58	27.15
50	22.32	26.64	29.72	32.84	18.05	19.05	21.56	24.09	26.58
51	21.85	26.11	29.15	32.18	17.68	18.67	21.15	23.60	26.05
52	21.43	25.61	28.58	31.58	17.34	18.30	20.72	23.17	25.56
53	21.05	25.13	28.03	30.98	17.02	17.96	20.32	22.71	25.08
54	20.64	24.66	27.53	30.39	16.70	17.62	19.95	22.30	24.60
55	20.28	24.21	27.02	29.85	16.40	17.31	19.59	21.88	24.18
56	19.90	23.78	26.52	29.32	16.11	17.00	19.24	21.50	23.74
57	19.57	23.36	26.08	28.79	15.82	16.71	18.90	21.14	23.31
58	19.23	22.96	25.62	28.32	15.55	16.41	18.58	20.77	22.92
59	18.89	22.57	25.19	27.82	15.28	16.13	18.25	20.40	22.52
60	18.59	22.20	24.77	27.38	15.04	15.88	17.96	20.08	22.17
61	18.28	21.83	24.35	26.92	14.78	15.61	17.66	19.73	21.78
62	17.97	21.48	23.97	26.47	14.56	15.35	17.38	19.42	21.42
63	17.70	21.14	23.59	26.05	14.32	15.12	17.10	19.11	21.10
64	17.43	20.81	23.22	25.65	14.10	14.87	16.82	18.80	20.76
65	17.17	20.49	22.87	25.27	13.87	14.64	16.58	18.52	20.44
66	16.90	20.18	22.52	24.88	13.68	14.42	16.32	18.24	20.15
67	16.64	19.88	22.19	24.50	13.47	14.22	16.09	17.98	19.83

TAPE DRIVEN

RING SPINNING FRAME TWIST TABLE

1 IN. DIA. FRONT ROLL. 8 IN. DIA CYLINDER. FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, 5/16" Dia. Ratio Whirl to Cylinder, 9.846								
	Jack 72 Cyl. 29	Jack 86 Cyl. 29	Jack 96 Cyl. 29	Jack 106 Cyl. 29	Jack 72 Cyl. 39	Jack 76 Cyl. 39	Jack 86 Cyl. 39	Jack 96 Cyl. 39	Jack 106 Cyl. 39
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	26.14	31.23	34.86	38.49	19.44	20.52	23.22	25.92	28.62
26	25.15	30.02	33.53	37.00	18.70	19.72	22.35	24.92	27.52
27	24.20	28.91	32.27	35.64	18.01	19.00	21.50	24.00	26.51
28	23.35	27.85	31.15	34.37	17.37	18.32	20.74	23.15	25.55
29	22.54	26.92	30.08	33.18	16.77	17.70	20.02	22.35	24.67
30	21.79	26.02	29.05	32.08	16.21	17.10	19.34	21.60	23.85
31	21.07	25.19	28.15	31.02	15.69	16.55	18.72	20.89	23.09
32	20.42	24.40	27.24	30.09	15.20	16.03	18.14	20.24	22.37
33	19.80	23.65	26.42	29.17	14.73	15.55	17.59	19.63	21.68
34	19.22	22.95	25.64	28.31	14.30	15.09	17.07	19.05	21.03
35	18.68	22.29	24.91	27.49	13.89	14.67	16.59	18.51	20.44
36	18.16	21.66	24.21	26.75	13.51	14.26	16.12	18.00	19.87
37	17.67	21.09	23.57	26.00	13.14	13.88	15.69	17.51	19.34
38	17.20	20.53	22.94	25.31	12.80	13.50	15.27	17.05	18.83
39	16.76	20.01	22.35	24.65	12.47	13.15	14.88	16.61	18.35
40	16.34	19.52	21.79	24.06	12.15	12.83	14.51	16.20	17.89
41	15.94	19.04	21.25	23.47	11.86	12.51	14.16	15.80	17.45
42	15.56	18.59	20.77	22.91	11.58	12.21	13.82	15.42	17.04
43	15.20	18.17	20.28	22.38	11.30	11.92	13.50	15.07	16.64
44	14.86	17.73	19.82	21.85	11.05	11.66	13.19	14.72	16.26
45	14.53	17.33	19.38	21.38	10.81	11.40	12.90	14.40	15.90
46	14.21	16.97	18.95	20.92	10.57	11.15	12.62	14.09	15.56
47	13.90	16.60	18.55	20.45	10.33	10.91	12.34	13.79	15.22
48	13.62	16.26	18.17	20.03	10.12	10.69	12.09	13.50	14.90
49	13.33	15.92	17.78	19.63	9.92	10.47	11.84	13.22	14.60
50	13.07	15.61	17.41	19.25	9.73	10.25	11.62	12.96	14.31
51	12.81	15.30	17.10	18.87	9.53	10.05	11.38	12.70	14.03
52	12.57	15.00	16.78	18.50	9.34	9.86	11.16	12.46	13.76
53	12.33	14.73	16.45	18.14	9.17	9.68	10.94	12.22	13.50
54	12.10	14.45	16.14	17.82	9.00	9.50	10.74	12.00	13.25
55	11.88	14.20	15.84	17.49	8.84	9.33	10.55	11.78	13.00
56	11.68	13.93	15.57	17.18	8.68	9.16	10.37	11.57	12.78
57	11.48	13.69	15.29	16.87	8.53	9.00	10.18	11.37	12.55
58	11.28	13.46	15.03	16.59	8.38	8.84	10.01	11.18	12.33
59	11.09	13.22	14.78	16.31	8.24	8.69	9.84	10.98	12.12
60	10.90	13.01	14.53	16.03	8.10	8.55	9.68	10.80	11.92
61	10.71	12.79	14.29	15.77	7.97	8.41	9.52	10.62	11.72
62	10.52	12.59	14.06	15.51	7.84	8.27	9.36	10.45	11.53
63	10.38	12.38	13.83	15.27	7.72	8.14	9.22	10.28	11.36
64	10.21	12.20	13.62	15.03	7.59	8.02	9.07	10.12	11.18
65	10.05	12.01	13.41	14.80	7.48	7.88	8.93	9.97	11.00
66	9.90	11.83	13.21	14.58	7.37	7.77	8.79	9.82	10.83
67	9.76	11.65	13.01	14.36	7.25	7.66	8.66	9.67	10.68

TAPE DRIVEN

RING SPINNING FRAME TWIST TABLE.

1 IN. DIA. FRONT ROLL 8 IN. DIA. CYLINDER.

FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, 7/8" Dia. Ratio Whirl to Cylinder, 9.1429								
	Jack 96 Cyl. 17	Jack 72 Cyl. 21	Jack 76 Cyl. 21	Jack 86 Cyl. 21	Jack 96 Cyl. 21	Jack 72 Cyl. 29	Jack 86 Cyl. 29	Jack 72 Cyl. 39	Jack 86 Cyl. 39
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	55.29	33.52	35.39	40.05	44.70	24.28	29.00	18.05	21.56
26	53.13	32.22	34.02	38.51	43.00	23.37	27.86	17.36	20.74
27	51.19	31.04	32.76	37.11	41.39	22.49	26.82	16.71	19.96
28	49.37	29.92	31.60	35.78	39.93	21.68	25.87	16.12	19.26
29	47.60	28.90	30.50	34.56	38.55	20.92	24.99	15.57	18.58
30	46.07	27.95	29.47	33.40	37.27	20.22	24.18	15.04	17.97
31	44.57	27.04	28.52	32.32	36.07	19.57	23.38	14.56	17.39
32	43.16	26.20	27.63	31.31	34.91	18.97	22.63	14.10	16.85
33	41.90	25.39	26.80	30.36	33.87	18.40	21.95	13.68	16.33
34	40.62	24.64	26.02	29.47	32.89	17.86	21.30	13.28	15.85
35	39.48	23.93	25.27	28.62	31.95	17.34	20.69	12.90	15.40
36	38.39	23.27	24.59	27.83	31.05	16.86	20.12	12.53	14.97
37	37.37	22.63	23.90	27.08	30.20	16.40	19.58	12.20	14.58
38	36.35	22.04	23.27	26.38	29.42	15.98	19.06	11.88	14.19
39	35.41	21.48	22.66	25.69	28.65	15.58	18.58	11.57	13.83
40	34.56	20.95	22.12	25.03	27.91	15.17	18.12	11.28	13.48
41	33.71	20 43	21.58	24.43	27.28	14.80	17.68	11.01	13.14
42	32.88	19.94	21.05	23.85	26.60	14.46	17.25	10.74	12.83
43	32.15	19.49	20.57	23.30	25.99	14.12	16.84	10.49	12.53
44	31.40	19.04	20.10	22.78	25.40	13.80	16.47	10.26	12.25
45	30.70	18.62	19.64	22.25	24.85	13.50	16.10	10.02	11.97
46	30.05	18 23	19.23	21.77	24.31	13.20	15.74	9.83	11.72
47	29.40	17.82	18.81	21.31	23.78	12.92	15 41	9.60	11.47
48	28.78	17.44	18.42	20.86	23 28	12.65	15 09	9.40	11.23
49	28.18	17.10	18.05	20.41	22 80	12.39	14.78	9.21	11.00
50	27.63	16.76	17.68	20.01	22.35	12.11	14.50	9.03	10.78
51	27.09	16.43	17.33	19.65	21.92	11.91	14.20	8.84	10.57
52	26.56	16.11	17.01	19.27	21.48	11.68	13.92	8.68	10.36
53	26.06	15.81	16.68	18.89	21.09	11.46	13.68	8.52	10.18
54	25.59	15.51	16.37	18.56	20.69	11.23	13.41	8.36	9.98
55	25.13	15.23	16.08	18.22	20.32	11.03	13.17	8.21	9.80
56	24.67	14.97	15.79	17.88	19.95	10.83	12.93	8.06	9.63
57	24.22	14.70	15.51	17.58	19.60	10.64	12.71	7.92	9.46
58	23.81	14.45	15.24	17.27	19.27	10.47	12.48	7.78	9.29
59	23.41	14.20	14.98	16.97	18.94	10.28	12.28	7.64	9.14
60	23.02	13.97	14.74	16.70	18 62	10.11	12.08	7.52	8.98
61	22.64	13.72	14.50	16.42	18.33	9.95	11.88	7.39	8 84
62	22.28	13.52	14.27	16.15	18.02	9.78	11.69	7.28	8 69
63	21.93	13.30	14.03	15 90	17 73	9 64	11.49	7.16	8.56
64	21.59	13.09	13.82	15.66	17.46	9 48	11.31	7.05	8.42
65	21.24	12.89	13.61	15.13	17.20	9.34	11.13	6.94	8.29
66	20.92	12.70	13.40	15.18	16.92	9.20	10.98	6.84	8.17
67	20.61	12.51	13.20	14.94	16.68	9.06	10.82	6.74	8.05

TAPE DRIVEN

RING SPINNING FRAME TWIST TABLE.

1 IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER. FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, 15/16" Dia. Ratio Whirl to Cylinder, 8.533								
	Jack 72 Cyl. 17	Jack 86 Cyl. 17	Jack 96 Cyl. 17	Jack 106 Cyl. 17	Jack 72 Cyl. 21	Jack 76 Cyl. 21	Jack 86 Cyl. 21	Jack 96 Cyl. 21	Jack 106 Cyl. 21
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	38.65	46.17	51.54	56.90	31.29	33.02	37.37	41.71	46.06
26	37.17	44.39	49.55	54.72	30.08	31.75	35.93	40.11	44.29
27	35.79	42.75	47.72	52.69	28.97	30.58	34.60	38.62	42.65
28	34.51	41.22	46.01	50.81	27.93	29.49	33.37	37.24	41.12
29	33.32	39.80	44.43	49.06	26.97	28.47	32.21	35.96	39.71
30	32.21	38.47	42.95	47.42	26.07	27.52	31.14	34.76	38.38
31	31.17	37.23	41.56	45.89	25.23	26.63	30.14	33.64	37.14
32	30.19	36.07	40.26	44.46	24.44	25.80	29.19	32.59	35.98
33	29.28	34.98	39.04	43.11	23.70	25.02	28.31	31.60	34.89
34	28.42	33.95	37.89	41.84	23.00	24.28	27.48	30.67	33.87
35	27.61	32.98	36.81	40.65	22.35	23.59	26.69	29.80	32.90
36	26.84	32.06	35.79	39.52	21.73	22.93	25.95	28.97	31.99
37	26.12	31.19	34.82	38.45	21.14	22.31	25.25	28.19	31.12
38	25.43	30.37	33.91	37.44	20.58	21.73	24.58	27.44	30.30
39	24.77	29.59	33.04	36.48	20.05	21.17	23.95	26.74	29.53
40	24.16	28.86	32.21	35.57	19.55	20.64	23.36	26.07	28.79
41	23.57	28.15	31.42	34.70	19.07	20.14	22.79	25.43	28.08
42	23.01	27.48	30.68	33.87	18.62	19.66	22.24	24.83	27.42
43	22.47	26.81	29.96	33.08	18.19	19.20	21.73	24.25	26.78
44	21.96	26.23	29.28	32.33	17.78	18.76	21.23	23.70	26.17
45	21.47	25.65	28.63	31.61	17.38	18.35	20.76	23.17	25.59
46	21.01	25.09	28.01	30.93	17.00	17.95	20.31	22.67	25.03
47	20.56	24.56	27.41	30.27	16.64	17.57	19.88	22.19	24.50
48	20.13	24.05	26.84	29.64	16.29	17.20	19.46	21.73	23.99
49	19.72	23.56	26.29	29.03	15.96	16.85	19.07	21.28	23.50
50	19.32	23.08	25.77	28.45	15.64	16.51	18.68	20.86	23.03
51	18.95	22.63	25.26	27.89	15.34	16.19	18.32	20.45	22.58
52	18.58	22.20	24.78	27.36	15.04	15.88	17.97	20.05	22.14
53	18.23	21.78	24.31	26.84	14.76	15.58	17.63	19.68	21.73
54	17.89	21.37	23.86	26.34	14.48	15.29	17.30	19.31	21.32
55	17.57	20.99	23.43	25.87	14.22	15.01	16.99	18.96	20.94
56	17.26	20.61	23.01	25.40	13.97	14.74	16.68	18.62	20.56
57	16.95	20.25	22.60	24.96	13.72	14.48	16.39	18.30	20.20
58	16.66	19.90	22.21	24.53	13.49	14.23	16.11	17.98	19.85
59	16.38	19.56	21.84	24.11	13.26	13.99	15.83	17.68	19.52
60	16.11	19.24	21.47	23.71	13.04	13.76	15.57	17.38	19.19
61	15.84	18.92	21.12	23.32	12.82	13.53	15.32	17.10	18.88
62	15.59	18.62	20.78	22.95	12.62	13.32	15.07	16.82	18.57
63	15.33	18.32	20.45	22.58	12.41	13.10	14.83	16.55	18.28
64	15.10	18.03	20.13	22.23	12.22	12.90	14.60	16.29	17.99
65	14.87	17.76	19.82	21.89	12.03	12.70	14.37	16.04	17.72
66	14.64	17.49	19.52	21.55	11.85	12.51	14.15	15.80	17.45
67	14.42	17.23	19.23	21.23	11.67	12.32	13.94	15.56	17.19

TAPE DRIVEN
RING SPINNING FRAME TWIST TABLE.
1 IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER
FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, 1" Dia. Ratio Whirl to Cylinder, 8.000								
	Jack 72 Cyl. 17	Jack 86 Cyl. 17	Jack 96 Cyl. 17	Jack 106 Cyl. 17	Jack 72 Cyl. 21	Jack 76 Cyl. 21	Jack 86 Cyl. 21	Jack 96 Cyl. 21	Jack 106 Cyl. 21
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	36.23	43.28	48.31	53.35	29.33	30.96	35.04	39.11	43.18
26	34.81	41.62	46.46	51.30	28.20	29.77	33.69	37.61	41.52
27	33.55	40.08	44.74	49.40	27.16	28.67	32.44	36.21	39.99
28	32.35	38.64	43.14	47.63	26.19	27.65	31.28	34.92	38.56
29	31.24	37.31	41.65	45.99	25.29	26.69	30.20	33.72	37.23
30	30.20	36.07	40.26	44.46	24.41	25.80	29.20	32.59	35.99
31	29.22	34.90	38.96	43.02	23.66	24.97	28.26	31.54	34.83
32	28.31	33.81	37.75	41.68	22.92	24.19	27.37	30.56	33.74
33	27.45	32.79	36.60	40.41	22.22	23.46	26.54	29.63	32.72
34	26.64	31.83	35.52	39.23	21.57	22.77	25.76	28.76	31.75
35	25.88	30.92	34.51	38.11	20.95	22.12	25.03	27.93	30.85
36	25.16	30.06	33.55	37.05	20.37	21.50	24.33	27.16	29.99
37	24.48	29.24	32.65	36.05	19.82	20.92	23.67	26.43	29.18
38	23.84	28.48	31.79	35.09	19.30	20.37	23.05	25.73	28.41
39	23.23	27.74	30.97	34.20	18.80	19.85	22.46	25.07	27.68
40	22.65	27.05	30.20	33.34	18.33	19.35	21.90	24.44	26.99
41	22.10	26.39	29.46	32.53	17.89	18.88	21.36	23.85	26.33
42	21.57	25.76	28.76	31.75	17.46	18.43	20.86	23.28	25.71
43	21.07	25.16	28.09	31.02	17.05	18.00	20.37	22.74	25.11
44	20.59	24.59	27.15	30.31	16.67	17.59	19.91	22.22	24.54
45	20.13	24.05	26.84	29.64	16.30	17.20	19.46	21.73	23.99
46	19.69	23.52	26.26	28.99	15.94	16.83	19.04	21.26	23.47
47	19.27	23.02	25.70	28.38	15.60	16.47	18.64	20.80	22.97
48	18.87	22.51	25.16	27.79	15.28	16.13	18.25	20.37	22.49
49	18.49	22.08	24.65	27.22	14.97	15.80	17.88	19.95	22.03
50	18.12	21.64	24.16	26.67	14.67	15.48	17.52	19.56	21.59
51	17.76	21.22	23.68	26.15	14.38	15.18	17.17	19.17	21.17
52	17.42	20.81	23.23	25.65	14.10	14.89	16.84	18.80	20.76
53	17.09	20.42	22.79	25.16	13.84	14.60	16.52	18.45	20.37
54	16.78	20.04	22.37	24.70	13.58	14.33	16.22	18.11	19.99
55	16.48	19.67	21.96	24.25	13.33	14.07	15.93	17.78	19.63
56	16.17	19.32	21.57	23.82	13.10	13.82	15.64	17.46	19.28
57	15.89	18.98	21.19	23.40	12.87	13.58	15.37	17.15	18.94
58	15.61	18.66	20.82	22.99	12.64	13.35	15.10	16.86	18.61
59	15.35	18.34	20.47	22.60	12.43	13.12	14.85	16.57	18.30
60	15.10	18.03	20.13	22.23	12.22	12.90	14.60	16.30	17.99
61	14.85	17.74	19.80	21.86	12.02	12.69	14.36	16.03	17.70
62	14.61	17.45	19.48	21.51	11.83	12.48	14.13	15.77	17.41
63	14.38	17.18	19.17	21.16	11.64	12.29	13.90	15.52	17.14
64	14.15	16.91	18.87	20.84	11.46	12.09	13.69	15.28	16.87
65	13.94	16.65	18.58	20.52	11.28	11.91	13.48	15.04	16.61
66	13.73	16.39	18.30	20.21	11.11	11.73	13.27	14.81	16.36
67	13.52	16.15	18.03	19.91	10.95	11.55	13.07	14.59	16.11

TAPE DRIVEN

RING SPINNING FRAME TWIST TABLE.

1 IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER

FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, 1" Dia. Ratio Whirl to Cylinder, 8.000								
	Jack 72 Cyl. 29	Jack 86 Cyl. 29	Jack 96 Cyl. 29	Jack 106 Cyl. 29	Jack 72 Cyl. 39	Jack 76 Cyl. 39	Jack 86 Cyl. 39	Jack 96 Cyl. 39	Jack 106 Cyl. 39
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	21.21	25.37	28.32	31.27	15.79	16.67	18.86	21.06	23.25
26	20.43	24.10	27.23	30.07	15.19	16.03	18.14	20.25	22.36
27	19.67	23.19	26.23	28.96	14.62	15.44	17.47	19.50	21.53
28	18.97	22.66	25.29	27.92	14.10	14.90	16.84	18.80	20.76
29	18.31	21.87	24.12	26.96	13.62	14.37	16.26	18.15	20.04
30	17.70	21.14	23.60	26.06	13.16	13.89	15.72	17.55	19.38
31	17.13	20.46	22.84	25.22	12.74	13.44	15.21	16.98	18.75
32	16.60	19.82	22.13	21.43	12.34	13.02	14.74	16.45	18.17
33	16.09	19.22	21.46	23.69	11.97	12.63	14.29	15.95	17.62
34	15.62	18.66	20.83	23.00	11.61	12.26	13.87	15.48	17.10
35	15.17	18.12	20.23	22.34	11.28	11.91	13.47	15.01	16.61
36	14.75	17.62	19.67	21.72	10.97	11.58	13.10	14.62	16.15
37	14.35	17.14	19.14	21.13	10.67	11.26	12.75	14.23	15.71
38	13.98	16.69	18.63	20.58	10.39	10.97	12.41	13.85	15.30
39	13.62	16.27	18.16	20.05	10.12	10.69	12.09	13.50	14.91
40	13.28	15.86	17.70	19.55	9.87	10.12	11.79	13.16	14.53
41	12.95	15.47	17.27	19.07	9.63	10.17	11.50	12.84	14.18
42	12.64	15.10	16.86	18.62	9.40	9.92	11.24	12.53	13.84
43	12.35	14.75	16.47	18.18	9.18	9.69	10.97	12.24	13.52
44	12.07	14.42	16.09	17.77	8.97	9.47	10.72	11.97	13.21
45	11.80	14.10	15.74	17.37	8.77	9.26	10.48	11.70	12.92
46	11.55	13.79	15.39	17.00	8.58	9.06	10.25	11.44	12.64
47	11.30	13.50	15.07	16.64	8.40	8.87	10.03	11.20	12.37
48	11.06	13.22	14.75	16.29	8.23	8.68	9.83	10.97	12.11
49	10.84	12.95	14.45	15.96	8.06	8.51	9.62	10.74	11.86
50	10.62	12.69	14.16	15.64	7.90	8.34	9.43	10.53	11.63
51	10.41	12.44	13.88	15.33	7.74	8.17	9.25	10.32	11.40
52	10.21	12.20	13.62	15.04	7.59	8.02	9.07	10.12	11.18
53	10.02	11.97	13.36	14.75	7.45	7.86	8.90	9.93	10.97
54	9.83	11.75	13.11	14.47	7.31	7.72	8.73	9.75	10.76
55	9.66	11.53	12.87	14.22	7.18	7.58	8.57	9.57	10.57
56	9.48	11.33	12.64	13.96	7.05	7.44	8.42	9.40	10.38
57	9.32	11.13	12.42	13.72	6.93	7.31	8.27	9.24	10.20
58	9.16	10.94	12.21	13.48	6.81	7.19	8.13	9.08	10.02
59	9.00	10.75	12.00	13.25	6.69	7.06	7.99	8.92	9.85
60	8.85	10.57	11.80	13.03	6.58	6.95	7.86	8.77	9.69
61	8.71	10.40	11.61	12.82	6.47	6.83	7.73	8.63	9.53
62	8.57	10.23	11.42	12.61	6.37	6.72	7.61	8.49	9.38
63	8.43	10.07	11.24	12.41	6.27	6.62	7.49	8.36	9.23
64	8.30	9.91	11.06	12.22	6.17	6.51	7.37	8.23	9.08
65	8.17	9.76	10.89	12.03	6.07	6.41	7.26	8.10	8.94
66	8.05	9.61	10.73	11.85	5.98	6.31	7.15	7.98	8.81
67	7.93	9.47	10.57	11.67	5.89	6.22	7.04	7.86	8.68

TAPE DRIVEN

RING SPINNING FRAME TWIST TABLE.

1 IN. DIA FRONT ROLL. 8 IN. DIA. CYLINDER

FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, 1 1/16" Dia. Ratio Whirl to Cylinder, 7.529								
	Jack 96 Cyl. 17	Jack 72 Cyl. 21	Jack 76 Cyl. 21	Jack 86 Cyl. 21	Jack 96 Cyl. 21	Jack 72 Cyl. 29	Jack 86 Cyl. 29	Jack 72 Cyl. 39	Jack 86 Cyl. 39
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	45.47	27.61	29.14	32.97	36.81	19.99	23.87	14.86	17.75
26	43.72	26.55	28.02	31.71	35.40	19.22	22.95	14.29	17.08
27	42.10	25.56	26.98	30.53	34.10	18.51	22.11	13.75	16.44
28	40.60	24.65	26.02	29.44	32.88	17.85	21.32	13.27	15.86
29	39.20	23.80	25.12	28.43	31.77	17.23	20.58	12.80	15.31
30	37.89	23.01	24.28	27.48	30.70	16.67	19.88	12.38	14.80
31	36.67	22.26	23.50	26.59	29.69	16.12	19.24	11.98	14.31
32	35.52	21.57	22.77	25.76	28.79	15.62	18.64	11.60	13.88
33	34.45	20.91	22.08	24.98	27.90	15.14	18.07	11.24	13.45
34	33.43	20.30	21.43	24.24	27.08	14.70	17.55	10.92	13.06
35	32.48	19.72	20.82	23.55	26.31	14.28	17.04	10 61	12.68
36	31.58	19.17	20.24	22.90	25.58	13.88	16.58	10.31	12.33
37	30.72	18.65	19.69	22.28	24.88	13.51	16 12	10.03	12.00
38	29.91	18.16	19.17	21.69	24.22	13.15	15.70	9.77	11.68
39	29.15	17.70	18.68	21.14	23.62	12.82	15.29	9.52	11.38
40	28.42	17.25	18.21	20.61	23.03	12.49	14.92	9.29	11.10
41	27.73	16.83	17.77	20.11	22.48	12.19	14.54	9.05	10.82
42	27.07	16.43	17.35	19.63	21.94	11.90	14.20	8.84	10.58
43	26.44	16.05	16.94	19.18	21.40	11.62	13.88	8.63	10.32
44	25.84	15.69	16.56	18.74	20.93	11.36	13.56	8.44	10.09
45	25.26	15.34	16.19	18.32	20.47	11.11	13.27	8.25	9.87
46	24.71	15.00	15.84	17.92	20.01	10.87	12.98	8.07	9.65
47	24.19	14.69	15.50	17.54	19.58	10.63	12.69	7.90	9.45
48	23.68	14.38	15.18	17.18	19.19	10.41	12.43	7.73	9.25
49	23.20	14.09	14.87	16.82	18.79	10.20	12.18	7.58	9.07
50	22.73	13.80	14.57	16.49	18.42	9.98	11.93	7.43	8.88
51	22.29	13.53	14.28	16 17	18.05	9.80	11.70	7.28	8.71
52	21 86	13.27	14.01	15.85	17.71	9.62	11.48	7.14	8.54
53	21.45	13.02	13.75	15.56	17.38	9.43	11.26	7.01	8.38
54	21.05	12.78	13.49	15.27	17.07	9.26	11.05	6.87	8.22
55	20.67	12.55	13.24	14.98	16.73	9.08	10.84	6.75	8.07
56	20.30	12.32	13.01	14.73	16.45	8.92	10.66	6.63	7.93
57	19.94	12.11	12.78	14.47	16.15	8.77	10.47	6.52	7.78
58	19.60	11.90	12.56	14.21	15.88	8.62	10.28	6.40	7.65
59	19.27	11.70	12.35	13.97	15.60	8.47	10.12	6.29	7.53
60	18.94	11.50	12.14	13.73	15.34	8.33	9.94	6.18	7.40
61	18.64	11.31	11.94	13.51	15.10	8.19	9.78	6.08	7.28
62	18 33	11.13	11.75	13.29	14.86	8.06	9.62	5.98	7.17
63	18.04	10.96	11.56	13.09	14 62	7.93	9.48	5.88	7.04
64	17.76	10.78	11.38	12.88	14.39	7.81	9.32	5.80	6.94
65	17.49	10.62	11.21	12.68	14.17	7.68	9.18	5.72	6.83
66	17.22	10.46	11.04	12.49	13.95	7.57	9.04	5.63	6.73
67	16.97	10.30	10.87	12.30	13.73	7.46	8.91	5.55	6.62

TAPE DRIVEN
RING SPINNING FRAME TWIST TABLE.
1 IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER
FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, 1⅛" Dia. Ratio Whirl to Cylinder, 7.111								
	Jack 72 Cyl. 17	Jack 86 Cyl. 17	Jack 96 Cyl. 17	Jack 106 Cyl. 17	Jack 72 Cyl. 21	Jack 76 Cyl. 21	Jack 86 Cyl. 21	Jack 96 Cyl. 21	Jack 106 Cyl. 21
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	32.21	38.48	42.95	47.43	26.08	27.53	31.15	34.77	38.40
26	30.99	37.01	41.35	45.60	25.07	26.46	29.96	33.42	36.92
27	29.82	35.63	39.79	43.91	24.15	25.47	28.84	32.20	35.58
28	28.78	34.39	38.39	42.34	23.30	24.58	27.83	31.04	34.30
29	27.78	33.19	37.02	40.88	22.50	23.72	26.87	29.99	33.13
30	26.84	32.07	35.79	39.52	21.74	22.94	25.96	28.97	32.00
31	25.99	31.03	34.62	38.24	21.04	22.19	25.13	28.04	30.98
32	25.18	30.07	33.53	37.05	20.40	21.50	24.35	27.18	30.00
33	24.40	29.17	32.55	35.94	19.77	20.83	23.60	26.35	29.09
34	23.69	28.32	31.59	34.87	19.20	20.22	22.90	25.58	28.24
35	23.00	27.49	30.65	33.88	18.63	19.65	22.25	24.84	27.43
36	22.38	26.75	29.81	32.97	18.12	19.11	21.63	24.16	26.68
37	21.77	26.01	29.00	32.05	17.63	18.59	21.04	23.50	25.98
38	21.20	25.32	28.23	31.20	17.17	18.10	20.50	22.87	25.27
39	20.65	24.66	27.53	30.40	16.73	17.64	19.97	22.29	24.62
40	20.13	24.05	26.85	29.64	16.30	17.20	19.47	21.73	24.00
41	19.63	23.47	26.18	28.93	15.91	16.78	19.00	21.20	23.41
42	19.17	22.92	25.55	28.22	15.52	16.38	18.55	20.70	22.84
43	18.73	22.39	24.98	27.57	15.18	16.00	18.11	20.21	22.33
44	18.30	21.86	24.40	26.95	14.82	15.63	17.70	19.75	21.80
45	17.89	21.39	23.85	26.36	14.50	15.29	17.31	19.32	21.33
46	17.50	20.92	23.35	25.79	14.18	14.95	16.93	18.90	20.87
47	17.13	20.45	22.83	25.22	13.88	14.63	16.58	18.50	20.41
48	16.77	20.02	22.38	24.70	13.59	14.32	16.23	18.11	20.00
49	16.43	19.64	21.90	24.20	13.31	14.03	15.90	17.73	19.59
50	16.11	19.24	21.48	23.71	13.04	13.76	15.57	17.38	19.20
51	15.78	18.88	21.03	23.23	12.79	13.49	15.28	17.04	18.81
52	15.48	18.50	20.62	22.80	12.54	13.22	14.98	16.71	18.47
53	15.19	18.17	20.25	22.38	12.31	12.98	14.70	16.40	18.11
54	14.92	17.82	19.87	21.97	12.08	12.73	14.43	16.10	17.78
55	11.63	17.50	19.51	21.58	11.87	12.50	14.17	15.80	17.45
56	14.38	17.19	19.17	21.18	11.64	12.28	13.91	15.52	17.13
57	14.12	16.88	18.82	20.80	11.44	12.07	13.67	15.24	16.84
58	13.88	16.60	18.50	20.43	11.24	11.86	13.43	14.98	16.54
59	13.65	16.31	18.19	20.10	11.06	11.67	13.20	14.72	16.28
60	13.42	16.03	17.90	19.76	10.87	11.47	12.98	14.49	16.00
61	13.20	15.77	17.60	19.43	10.69	11.28	12.78	14.25	15.73
62	12.98	15.52	17.31	19.11	10.52	11.10	12.56	14.02	15.48
63	12.78	15.27	17.04	18.82	10.35	10.91	12.37	13.80	15.23
64	12.58	15.02	16.77	18.53	10.19	10.73	12.18	13.58	15.00
65	12.38	14.80	16.52	18.25	10.04	10.59	11.98	13.38	14.77
66	12.20	14.58	16.27	17.98	9.88	10.42	11.80	13.18	14.54
67	12.02	14.36	16.01	17.70	9.73	10.27	11.62	12.97	14.33

TAPE DRIVEN

RING SPINNING FRAME TWIST TABLE.

1 IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER FRONT ROLL GEAR, 84 T.

Whirl on Spindle, 1 1/8" Dia. Ratio Whirl to Cylinder, 7.111

Twist Change Gear	Jack 72 Cyl. 29	Jack 86 Cyl. 29	Jack 96 Cyl. 29	Jack 106 Cyl. 29	Jack 72 Cyl. 39	Jack 76 Cyl. 39	Jack 86 Cyl. 39	Jack 96 Cyl. 39	Jack 106 Cyl. 39
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	18.89	22.55	25.18	27.80	14.04	14.82	16.77	18.73	20.67
26	18.18	21.68	24.20	26.75	13.50	14.26	16.12	18.00	19.88
27	17.50	20.88	23.31	25.75	13.00	13.73	15.52	17.34	19.14
28	16.88	20.15	22.47	24.82	12.53	13.23	14.98	16.73	18.48
29	16.29	19.44	21.70	23.98	12.10	12.78	14.46	16.14	17.82
30	15.74	18.79	20.98	23.17	11.70	12.35	13.98	15.61	17.23
31	15.23	18.19	20.30	22.42	11.32	11.96	13.52	15.10	16.68
32	14.77	17.61	19.68	21.72	10.98	11.58	13.10	14.63	16.15
33	14.32	17.08	19.07	21.04	10.63	11.22	12.70	14.19	15.66
34	13.90	16.58	18.50	20.43	10.32	10.90	12.32	13.78	15.20
35	13.50	16.10	17.98	19.86	10.03	10.59	11.98	13.38	14.77
36	13.12	15.66	17.48	19.31	9.75	10.30	11.64	13.00	14.37
37	12.78	15.23	17.00	18.78	9.48	10.01	11.32	12.66	13.98
38	12.43	14.83	16.56	18.29	9.24	9.75	11.02	12.32	13.60
39	12.12	14.46	16.13	17.82	9.00	9.50	10.75	12.00	13.26
40	11.80	14.10	15.74	17.38	8.78	9.27	10.48	11.70	12.92
41	11.52	13.75	15.34	16.95	8.57	9.04	10.22	11.42	12.60
42	11.24	13.42	14.98	16.55	8.36	8.83	9.98	11.14	12.30
43	10.99	13.11	14.63	16.17	8.17	8.62	9.75	10.89	12.01
44	10.73	12.82	14.30	15.79	7.98	8.42	9.53	10.63	11.74
45	10.50	12.53	13.99	15.44	7.80	8.21	9.32	10.40	11.48
46	10.27	12.26	13.68	15.10	7.63	8.06	9.11	10.18	11.23
47	10.04	12.00	13.39	14.79	7.47	7.88	8.92	9.97	11.00
48	9.84	11.74	13.11	14.48	7.32	7.72	8.73	9.76	10.77
49	9.64	11.50	12.84	14.19	7.17	7.56	8.55	9.56	10.54
50	9.44	11.28	12.59	13.90	7.02	7.42	8.39	9.36	10.34
51	9.26	11.06	12.34	13.63	6.88	7.27	8.22	9.18	10.13
52	9.08	10.84	12.10	13.37	6.75	7.13	8.06	9.00	9.91
53	8.91	10.63	11.88	13.11	6.63	6.99	7.91	8.83	9.75
54	8.75	10.44	11.66	12.87	6.50	6.86	7.76	8.67	9.58
55	8.58	10.25	11.44	12.63	6.38	6.74	7.62	8.52	9.40
56	8.43	10.07	11.23	12.41	6.27	6.62	7.48	8.36	9.23
57	8.28	9.88	11.04	12.19	6.16	6.50	7.35	8.22	9.07
58	8.15	9.72	10.84	11.98	6.05	6.38	7.23	8.07	8.91
59	8.01	9.56	10.67	11.78	5.95	6.28	7.10	7.94	8.76
60	7.87	9.40	10.49	11.58	5.85	6.18	6.99	7.80	8.61
61	7.71	9.24	10.32	11.40	5.76	6.08	6.87	7.68	8.48
62	7.62	9.09	10.16	11.21	5.66	5.98	6.76	7.55	8.33
63	7.50	8.95	9.99	11.02	5.58	5.88	6.65	7.43	8.20
64	7.38	8.81	9.81	10.87	5.48	5.79	6.55	7.32	8.08
65	7.27	8.67	9.68	10.69	5.40	5.70	6.45	7.21	7.95
66	7.16	8.54	9.54	10.52	5.32	5.62	6.35	7.09	7.83
67	7.05	8.42	9.39	10.37	5.24	5.53	6.26	6.99	7.71

TAPE DRIVEN

RING SPINNING FRAME TWIST TABLE.

$1\frac{1}{16}$ IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER

FRONT ROLL GEAR, 84 T.

	Whirl on Spindle, $\frac{3}{4}$" Dia. Ratio Whirl to Cylinder, 10.666					Whirl on Spindle, $\frac{13}{16}$" Dia. Ratio Whirl to Cylinder, 9.846			
Twist Change Gear	Jack 76 Cyl. 21	Jack 72 Cyl. 17	Jack 106 Cyl. 21	Jack 86 Cyl. 17	Jack 106 Cyl. 17	Jack 76 Cyl. 21	Jack 72 Cyl. 17	Jack 86 Cyl. 17	Jack 96 Cyl. 17
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	38.87	45.48	54.21	54.33	66.96	35.88	41.99	50.15	55.98
26	37.40	43.69	52.04	52.24	64.40	34.50	40.35	48.20	53.83
27	36.00	42.08	50.20	50.30	62.00	33.22	38.84	46.46	51.84
28	34.75	40.55	48.40	48.50	59.80	32.03	37.45	44.78	49.98
29	33.52	39.20	46.70	46.83	57.70	30.92	36.17	43.20	48.23
30	32.40	37.90	45.11	45.27	55.80	29.89	34.99	41.80	46.65
31	31.35	36.63	43.65	43.80	53.98	28.94	33.84	40.47	45.15
32	30.38	35.52	42.31	42.48	52.30	28.02	32.79	39.18	43.74
33	29.45	34.43	41.00	41.10	50.68	27.18	31.79	37.98	42.42
34	28.60	33.42	39.83	39.97	49.20	26.38	30.85	36.86	41.13
35	27.78	32.47	38.71	38.79	47.80	25.62	29.99	35.81	39.99
36	27.01	31.58	37.60	37.72	46.50	24.93	29.15	34.80	38.85
37	26.27	30.71	36.60	36.70	45.22	24.23	28.37	33.86	37.80
38	25.59	29.91	35.63	35.72	44.02	23.60	27.60	32.98	36.82
39	24.92	29.16	34.75	34.80	42.93	23.00	26.90	32.14	35.87
40	24.29	28.43	33.88	33.96	41.85	22.42	26.24	31.34	34.99
41	23.72	27.72	33.02	33.10	40.85	21.87	25.59	30.58	34.15
42	23.17	27.02	32.23	32.32	39.84	21.35	24.98	29.83	33.32
43	22.60	26.41	31.50	31.58	38.92	20.84	24.39	29.17	32.54
44	22.10	25.81	30.78	30.85	38.03	20.38	23.84	28.48	31.80
45	21.60	25.25	30.10	30.18	37.20	19.93	23.32	27.85	31.08
46	21.15	24.72	29.44	29.51	36.38	19.50	22.80	27.23	30.40
47	20.68	24.19	28.81	28.89	35.62	19.08	22.32	26.66	29.77
48	20.24	23.67	28.20	28.28	34.87	18.69	21.84	26.12	29.17
49	19.84	23.20	27.63	27.70	34.17	18.30	21.40	25.58	28.56
50	19.43	22.74	27.10	27.16	33.48	17.94	20.99	25.08	27.99
51	19.06	22.29	26.56	26.60	32.81	17.59	20.58	24.58	27.43
52	18.70	21.83	26.05	26.12	32.19	17.23	20.18	24.10	26.90
53	18.34	21.45	25.57	25.60	31.57	16.92	19.79	23.63	26.40
54	18.01	21.06	25.07	25.15	31.00	16.61	19.42	23.20	25.91
55	17.68	20.66	24.62	24.67	30.43	16.30	19.07	22.79	25.43
56	17.37	20.29	24.19	24.23	29.88	16.01	18.72	22.39	25.00
57	17.05	19.93	23.77	23.80	29.38	15.72	18.39	22.00	24.55
58	16.77	19.59	23.36	23.40	28.85	15.46	18.09	21.60	24.10
59	16.48	19.27	22.96	23.00	28.38	15.20	17.77	21.23	23.71
60	16.19	18.95	22.59	22.64	27.90	14.95	17.49	20.90	23.33
61	15.93	18.63	22.20	22.24	27.43	14.70	17.19	20.54	22.93
62	15.68	18.33	21.82	21.90	27.00	14.46	16.90	20.20	22.57
63	15.42	18.04	21.50	21.55	26.58	14.23	16.65	19.90	22.20
64	15.19	17.77	21.18	21.20	26.17	14.01	16.39	19.58	21.85
65	14.95	17.48	20.83	20.88	25.76	13.79	16.13	19.28	21.52
66	14.72	17.22	20.52	20.58	25.37	13.58	15.90	19.00	21.19
67	14.50	16.97	20.23	20.27	24.99	13.39	15.67	18.71	20.89

TAPE DRIVEN

RING SPINNING FRAME TWIST TABLE.

$1\frac{1}{16}$ IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, ¾" Dia. Ratio Whirl to Cylinder, 9.143								
	Jack 72 Cyl. 17	Jack 86 Cyl. 17	Jack 106 Cyl. 17	Jack 72 Cyl. 21	Jack 86 Cyl. 21	Jack 106 Cyl. 21	Jack 76 Cyl. 29	Jack 96 Cyl. 29	Jack 86 Cyl. 39
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	38.99	46.57	57.40	31.56	37.70	46.47	24.13	30.47	20.30
26	37.49	44.80	55.20	30.36	36.25	44.65	23.19	29.31	19.53
27	36.10	43.13	53.15	29.24	34.91	43.00	22.32	28.21	18.80
28	34.80	41.58	51.25	28.20	33.66	41.50	21.52	27.20	18.12
29	33.60	40.15	49.49	27.23	32.50	40.05	20.79	26.27	17.50
30	32.49	38.81	47.83	26.30	31.42	38.72	20.10	25.40	16.92
31	31.45	37.58	46.26	25.46	30.40	37.45	19.44	24.57	16.38
32	30.47	36.40	44.85	24.64	29.46	36.30	18.83	23.80	15.86
33	29.54	35.30	43.49	23.91	28.58	35.20	18.28	23.08	15.38
34	28.64	34.25	42.20	23.21	27.75	34.18	17.73	22.40	14.93
35	27.84	33.29	41.00	22.55	26.95	33.19	17.22	21.78	14.50
36	27.08	32.38	39.86	21.92	26.20	32.28	16.73	21.17	14.10
37	26.35	31.49	38.79	21.32	25.48	31.40	16.29	20.60	13.72
38	25.65	30.64	37.78	20.78	24.81	30.58	15.86	20.04	13.36
39	24.99	29.85	36.80	20.22	24.18	29.79	15.46	19.54	13 01
40	24.37	29.11	35.88	19.73	23.56	29.04	15.08	19.05	12.69
41	23.76	28.40	35.00	19.24	23.00	28.35	14.70	18.58	12.38
42	23.20	27.74	34.18	18.79	22.44	27.65	14.34	18.14	12.09
43	22.66	27.10	33.39	18.36	21.92	27.01	14.02	17.71	11.80
44	22.17	26.47	32.60	17.93	21.42	26.40	13.70	17.31	11.53
45	21.65	25.88	31.89	17.54	20.95	25.80	13.39	16.93	11.28
46	21.19	25.33	31.20	17.15	20.48	25.25	13.10	16.56	11.02
47	20.74	24.79	30.54	16.79	20.05	24.72	12.82	16.20	10.80
48	20.30	24.24	29.90	16.43	19.63	24.20	12.55	15.87	10.58
49	19.88	23.75	29.29	16.10	19.24	23.70	12.30	15.55	10.36
50	19.49	23.28	28.70	15.78	18.85	23.23	12.06	15.24	10.15
51	19.11	22.80	28.17	15.47	18.48	22.78	11.82	14.93	9.96
52	18.73	22.38	27.60	15.17	18.13	22.35	11.59	14.65	9.76
53	18.38	21.96	27.07	14.89	17.78	21.90	11.37	14.37	9.57
54	18.04	21.55	26.58	14.61	17.46	21.52	11.16	14.10	9.40
55	17.72	21.17	26.09	14.33	17.13	21.11	10.95	13.85	9.23
56	17.40	20.79	25.62	14.10	16.83	20.74	10.76	13.60	9.06
57	17.10	20.40	25.19	13.83	16.53	20.38	10.58	13.37	8.90
58	16.80	20.04	24.72	13.60	16.26	20 02	10.39	13.13	8 75
59	16.52	19.72	24.31	13.37	15.98	19.69	10.21	12.91	8.60
60	16.25	19.40	23.92	13.15	15.71	19.36	10.05	12.70	8 46
61	15.97	19.07	23.52	12 93	15.45	19 03	9 88	12.48	8 32
62	15.71	18.76	23.15	12 72	15.20	18.72	9.72	12.28	8.18
63	15.47	18.47	22.78	12.52	14 96	18 43	9 56	12.09	8 06
64	15.22	18.18	22.42	12.32	14.72	18 15	9 42	11.90	7.93
65	14.99	17.90	22.07	12.14	14.50	17.87	9 27	11.72	7.81
66	14.76	17.63	21.75	11.96	14.28	17 60	9 13	11.54	7.69
67	14.55	17.38	21.42	11.78	14 07	17.34	9.00	11.37	7.57

TAPE DRIVEN

RING SPINNING FRAME TWIST TABLE.

$1\frac{1}{16}$ IN. DIA. FRONT ROLL. 8 IN. DIA. CYLINDER FRONT ROLL GEAR, 84 T.

Twist Change Gear	Whirl on Spindle, $\frac{15}{16}$" Dia. Ratio Whirl to Cylinder, 8.533					Whirl on Spindle, 1" Dia. Ratio Whirl to Cyl., 8.00			
	Jack 76 Cyl. 21	Jack 72 Cyl. 17	Jack 106 Cyl. 21	Jack 86 Cyl. 17	Jack 106 Cyl. 17	Jack 76 Cyl. 21	Jack 72 Cyl. 17	Jack 86 Cyl. 17	Jack 96 Cyl. 17
	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist	Twist
25	31.09	36.39	43.37	43.46	53.57	29.15	34.11	40.75	45.48
26	29.91	35.00	41.71	41.76	51.50	28.03	32.80	39.17	43.70
27	28.80	33.71	40.15	40.20	49.60	27.00	31.60	37.75	42.08
28	27.80	32.50	38.73	38.79	47.82	26.03	30.46	36.37	40.57
29	26.82	31.39	37.39	37.45	46.20	25.15	29.41	35.12	39.19
30	25.94	30.34	36.17	36.22	44.64	24.31	28.43	33.95	37.90
31	25.09	29.35	34.99	35.02	43.18	23.52	27.52	32.83	36.65
32	24.30	28.43	33.89	33.94	41.80	22.79	26.66	31.80	35.52
33	23.58	27.57	32.86	32.93	40.55	22.08	25.84	30.84	34.43
34	22.87	26.76	31.90	31.95	39.39	21.43	25.10	29.94	33.42
35	22.22	26.00	31.00	31.02	38.27	20.83	24.39	29.09	32.47
36	21.60	25.28	30.15	30.17	37.18	20.24	23.70	28.28	31.57
37	21.02	24.60	29.31	29.38	36.18	19.70	23.04	27.52	30.72
38	20.48	23.94	28.55	28.59	35.23	19.19	22.45	26.80	29.92
39	19.94	23.32	27.80	27.84	34.34	18.70	21.87	26.12	29.16
40	19.43	22.74	27.10	27.16	33.48	18.22	21.32	25.47	28.43
41	18.98	22.19	26.44	26.48	32.65	17.78	20.80	24.82	27.72
42	18.52	21.66	25.81	25.85	31.87	17.36	20.31	24.23	27.08
43	18.09	21.17	25.22	25.24	31.15	16.95	19.84	23.67	26.43
44	17.68	20.66	24.63	24.67	30.42	16.58	19.39	23.15	25.83
45	17.28	20.22	24.10	24.15	29.75	16.20	18.95	22.62	25.24
46	16.92	19.78	23.58	23.61	29.12	15.85	18.53	22.14	24 72
47	16.55	19.36	23.07	23.10	28.47	15.51	18.14	21.65	24 18
48	16.20	18.95	22.59	22.62	27.89	15.18	17.78	21.20	23.67
49	15.87	18.57	22.14	22.18	27.33	14.88	17.40	20.78	23.19
50	15.56	18 20	21.65	21 73	26.79	14.58	17.06	20.37	22.74
51	15.25	17.83	21.25	21.28	26.24	14.29	16.72	19.96	22.28
52	14.96	17.50	20.84	20.87	25.75	14.02	16.40	19.57	21.87
53	14.67	17.17	20.45	20.48	25.25	13.75	16.09	19 20	21.46
54	14.40	16.84	20.08	20.10	24.79	13.50	15.79	18 85	21.05
55	14.13	16.54	19.72	19.74	24.35	13.25	15.50	18.52	20.66
56	13.88	16.24	19.37	19.39	23.91	13.02	15.23	18.18	20.31
57	13.63	15.96	19.02	19.05	23.48	12.79	14.97	17.87	19.95
58	13.41	15.68	18.70	18.73	23.08	12.57	14.71	17.55	19.60
59	13.18	15.42	18.38	18.40	22.67	12.36	14.46	17.25	19.27
60	12.97	15.17	18.08	18 10	22.32	12.15	14.21	16.98	18.95
61	12.75	14.92	17.77	17.80	21.95	11.96	13.98	16.68	18.63
62	12.54	14.67	17.48	17.50	21.59	11.77	13.76	16.41	18.34
63	12.34	14.44	17.21	17.24	21.26	11.58	13.54	16.17	18.05
64	12.15	14.22	16.94	16.97	20.94	11.39	13.32	15.90	17.77
65	11.97	14.00	16 68	16.71	20.59	11.22	13.12	15.67	17.50
66	11.78	13.79	16.43	16 46	20.28	11 04	12 93	15.43	17.23
67	11 60	13.58	16.18	16 22	19.99	10.88	12.73	15.20	16.97

YARN TWIST TABLES.

Counts or Numbers	Square Root	Standard Warp Twist	Warp Twist	Extra Filling Twist	Filling or Hosiery Twist	Soft Hosiery Twist	Underwear Twist
1	**1.0000**	**4.75**	**4.50**	**3.50**	**3.25**	**3.00**	**2.75**
2	1.4142	6.72	6.36	4.95	4.60	4.24	3.89
3	1.7321	8.23	7.79	6.06	5.63	5.20	4.76
4	2.0000	9.50	9.00	7.00	6.50	6.00	5.50
5	2.2361	10.62	10.06	7.83	7.27	6 71	6.15
6	2.4495	11.63	11.02	8.57	7.96	7.35	6.74
7	2.6458	12.56	11.91	9.26	8.60	7.94	7.27
8	2.8284	13.43	12.73	9.90	9 19	8.48	7.78
9	3.0000	14.25	13.50	10.50	9.75	9.00	8.25
10	3.1623	15.02	14.23	11.07	10.28	9.49	8.69
11	3.3166	15.75	14.92	11.61	10.78	9.95	9.12
12	3.4641	16.45	15.59	12.12	11.26	10.39	9.52
13	3.6056	17.12	16.22	12.62	11.72	10.82	9.91
14	3.7417	17.77	16.84	13.10	12.16	11.22	10.29
15	3.8730	18.39	17.43	13.56	12.59	11.62	10.65
16	4.0000	19.00	18.00	14.00	13.00	12.00	11 00
17	4.1231	19.58	18.55	14.43	13.40	12.37	11.34
18	4.2426	20.15	19.09	14.85	13 79	12.73	11.66
19	4.3589	20.70	19.62	15.26	14.17	13.07	11.98
20	4.4721	21.24	20.12	15.65	14.53	13.41	12.30
21	4.5826	21.76	20.62	16.04	14.89	13.75	12.60
22	4.6901	22.27	21.11	16.42	15.24	14.07	12.89
23	4.7958	22.78	21.58	16.79	15.59	14.39	13.19
24	4.8990	23.27	22.05	17.15	15.92	14.70	13.47
25	5.0000	23.75	22.50	17.50	16.25	15.00	13.75
26	5.0990	24.22	22.95	17.85	16.57	15.30	14.02
27	5.1962	24.68	23.38	18.19	16.89	15.59	14.29
28	5.2915	25.13	23.81	18.52	17.20	15.87	14.55
29	5.3852	25.58	24.23	18.85	17.50	16.15	14.81
30	5.4772	26.02	24.65	19.17	17.80	16.43	15 06
31	5.5678	26 44	25.05	19 49	18.10	16.70	15.31
32	5.6569	26.87	25.46	19.80	18.38	16.97	15.55
33	5.7446	27.28	25.85	20.11	18.67	17.23	15.80
34	5.8310	27.69	26.24	20.41	18.95	17.49	16.03
35	5.9161	28.10	26.62	20.71	19.23	17.75	16.27
36	6.0000	28.50	27.00	21.00	19.50	18.00	16.50
37	6.0828	28.89	27.37	21.29	19.77	18.25	16.72
38	6.1641	29.28	27.74	21.58	20.03	18.49	16.95
39	6.2450	29.66	28.10	21.86	20.30	18.73	17.17
40	6.3246	30.04	28 46	22.14	20.55	18.97	17.39
41	6.4031	30.41	28.81	22.41	20.81	19.21	17.61
42	6.4807	30.78	29.16	22.68	21.06	19.44	17.82
43	6.5574	31.15	29.51	22.95	21.31	19.67	18.03
44	6.6332	31.51	29.85	23.22	21.56	19.90	18.24
45	6.7082	31.86	30.19	23.48	21.80	20.12	18.45
46	6.7823	32.22	30.52	23.71	22.04	20.35	18.65
47	6.8557	32.56	30.85	23.99	22.28	20.57	18.85
48	6.9282	32.91	31.18	24.25	22.52	20.78	19.05
49	7.0000	33.25	31.50	24.50	22.75	21.00	19.25
50	7.0711	33.59	31.82	24.75	22.98	21.21	19.44

YARN TWIST TABLES.

Counts or Numbers	Square Root	Standard Warp Twist	Warp Twist	Extra Filling Twist	Filling or Hosiery Twist	Soft Hosiery Twist	Underwear Twist
1	**1.0000**	**4.75**	**4.50**	**3.50**	**3.25**	**3.00**	**2.75**
51	7.1414	33.92	32.14	24.99	23.21	21.42	19.64
52	7.2111	34.25	32.45	25.24	23.44	21.63	19.83
53	7.2801	34.58	32.76	25.48	23.66	21.84	20.02
54	7.3485	34.91	33.07	25.72	23.88	22.04	20.21
55	7.4162	35.23	33.37	25.96	24.10	22.25	20.39
56	7.4833	35.55	33.67	26.19	24.32	22.45	20.58
57	7.5498	35.86	33.97	26.42	24.54	22.65	20.76
58	7.6158	36.17	34.27	26.66	24.75	22.85	20.94
59	7.6811	36.49	34.57	26.88	24.96	23.04	21.12
60	7.7460	36.79	34.86	27.11	25.17	23.24	21.30
61	7.8102	37.10	35.15	27.34	25.38	23.43	21.48
62	7.8740	37.40	35.43	27.56	25.59	23.62	21.65
63	7.9373	37.70	35.72	27.78	25.80	23.81	21.83
64	8.0000	38.00	36.00	28.00	26.00	24.00	22.00
65	8.0623	38.30	36.28	28.22	26.20	24.19	22.17
66	8.1240	38.59	36.56	28.43	26.40	24.37	22.34
67	8.1854	38.88	36.83	28.65	26.60	24.55	22.51
68	8.2462	39.17	37.11	28.86	26.80	24.74	22.68
69	8.3066	39.46	37.38	29.07	27.00	24.92	22.84
70	8.3666	39.74	37.65	29.28	27.19	25.10	23.01
71	8.4261	40.02	37.92	29.49	27.38	25.28	23.17
72	8.4853	40.31	38.18	29.70	27.58	25.45	23.33
73	8.5440	40.58	38.45	29.90	27.77	25.63	23.50
74	8.6023	40.86	38.71	30.11	27.96	25.81	23.66
75	8.6603	41.14	38.97	30.31	28.15	25.98	23.82
76	8.7178	41.41	39.23	30.51	28.33	26.15	23.97
77	8.7750	41.68	39.49	30.71	28.52	26.32	24.13
78	8.8318	41.95	39.74	30.91	28.70	26.49	24.29
79	8.8882	42.22	40.00	31.11	28.89	26.66	24.44
80	8.9443	42.49	40.25	31.30	29.07	26.83	24.60
81	9.0000	42.75	40.50	31.50	29.25	27.00	24.75
82	9.0554	43.01	40.75	31.69	29.43	27.16	24.90
83	9.1104	43.27	41.00	31.89	29.61	27.33	25.05
84	9.1652	43.53	41.24	32.08	29.79	27.49	25.20
85	9.2195	43.79	41.49	32.27	29.96	27.66	25.35
86	9.2736	44.05	41.73	32.46	30.14	27.82	25.50
87	9.3274	44.31	41.97	32.65	30.31	27.98	25.65
88	9.3808	44.56	42.21	32.83	30.49	28.14	25.80
89	9.4340	44.81	42.45	33.02	30.66	28.30	25.94
90	9.4868	45.06	42.69	33.20	30.83	28.46	26.09
91	9.5394	45.31	42.93	33.39	31.00	28.62	26.23
92	9.5917	45.56	43.16	33.57	31.17	28.77	26.38
93	9.6437	45.81	43.40	33.75	31.34	28.93	26.52
94	9.6954	46.05	43.63	33.93	31.51	29.09	26.66
95	9.7468	46.30	43.86	34.11	31.68	29.24	26.80
96	9.7980	46.54	44.09	34.29	31.84	29.39	26.94
97	9.8489	46.78	44.32	34.47	32.01	29.55	27.08
98	9.8995	47.02	44.55	34.65	32.17	29.70	27.22
99	9.9499	47.26	44.77	34.82	32.34	29.85	27.36
100	10.0000	47.50	45.00	35.00	32.50	30.00	27.50

YARN TWIST TABLES.

Counts or Numbers	Square Root	Standard Warp Twist	Warp Twist	Extra Filling Twist	Filling or Hosiery Twist	Soft Hosiery Twist	Underwear Twist
1	**1.0000**	**4.75**	**4.50**	**3.50**	**3.25**	**3.00**	**2.75**
101	10.0499	47.74	45.22	35.17	32.66	30.15	27.64
102	10.0995	47.97	45.45	35.35	32.82	30.30	27.77
103	10.1489	48.21	45.67	35.52	32.98	30.45	27.91
104	10.1980	48.44	45.89	35.69	33.14	30.59	28.04
105	10.2470	48.67	46.11	35.86	33.30	30.74	28.18
106	10.2956	48.90	46.33	36.03	33.46	30.89	28.31
107	10.3441	49.13	46.55	36.20	33.62	31.03	28.44
108	10.3923	49.36	46.77	36.37	33.77	31.19	28.58
109	10.4403	49.59	46.98	36.54	33.93	31.32	28.71
110	10.4881	49.82	47.20	36.71	34.09	31.46	28.84
111	10.5357	50.04	47.41	36.87	34.24	31.61	28.97
112	10.5830	50.27	47.62	37.04	34.39	31.75	29.10
113	10.6301	50.49	47.84	37.21	34.55	31.89	29.23
114	10.6771	50.72	48.05	37.37	34.70	32.03	29.36
115	10.7238	50.94	48.26	37.53	34.85	32.17	29.49
116	10.7703	51.16	48.47	37.70	35.00	32.31	29.62
117	10.8167	51.38	48.67	37.86	35.15	32.45	29.75
118	10.8628	51.60	48.88	38.02	35.30	32.59	29.87
119	10.9087	51.82	49.09	38.18	35.45	32.73	30.00
120	10.9545	52.03	49.30	38.34	35.60	32.86	30.12
121	11.0000	52.25	49.50	38.50	35.75	33.00	30.25
122	11.0454	52.47	49.70	38.66	35.90	33.14	30.37
123	11.0905	52.68	49.91	38.82	36.04	33.27	30.50
124	11.1355	52.89	50.11	38.97	36.19	33.41	30.62
125	11.1803	53.11	50.31	39.13	36.34	33.54	30.75
126	11.2250	53.32	50.51	39.29	36.48	33.67	30.87
127	11.2694	53.53	50.71	39.44	36.63	33.81	30.99
128	11.3137	53.74	50.91	39.60	36.77	33.94	31.11
129	11.3578	53.95	51.12	39.75	36.91	34.07	31.23
130	11.4018	54.16	51.31	39.91	37.06	34.20	31.35
131	11.4455	54.37	51.50	40.06	37.20	34.34	31.48
132	11.4891	54.57	51.70	40.21	37.34	34.47	31.60
133	11.5326	54.78	51.90	40.36	37.48	34.60	31.71
134	11.5758	54.99	52.09	40.52	37.62	34.73	31.83
135	11.6190	55.19	52.29	40.67	37.76	34.86	31.95
136	11.6619	55.39	52.48	40.82	37.90	34.98	32.07
137	11.7047	55.60	52.67	40.97	38.04	35.11	32.19
138	11.7473	55.80	52.86	41.12	38.18	35.24	32.31
139	11.7898	56.00	53.05	41.26	38.32	35.37	32.42
140	11.8322	56.20	53.24	41.41	38.45	35.50	32.54
141	11.8743	56.40	53.43	41.56	38.59	35.62	32.65
142	11.9164	56.60	53.62	41.71	38.73	35.75	32.77
143	11.9583	56.80	53.81	41.85	38.86	35.87	32.89
144	12.0000	57.00	54.00	42.00	39.00	36.00	33.00
145	12.0416	57.20	54.19	42.15	39.14	36.12	33.11
146	12.0830	57.39	54.37	42.29	39.27	36.25	33.23
147	12.1244	57.59	54.56	42.44	39.40	36.37	33.34
148	12.1655	57.79	54.74	42.58	39.54	36.50	33.46
149	12.2066	57.98	54.93	42.72	39.67	36.62	33.57
150	12.2474	58.18	55.11	42.87	39.80	36.74	33.68

NOTE—The above tables are extended in some cases much beyond the actual requirements as indicated by their headings, but will prove useful for other yarns.

TABLE FOR NUMBERING COTTON YARN BY THE WEIGHT IN GRAINS OF 120 YARDS OR 1 SKEIN

120 Yds. Weigh Grains	No. of Yarn	120 Yds. Weigh Grains	No. of Yarn	120 Yds. Weigh Grains	No. of Yarn	120 Yds. Weigh Grains	No. of Yarn	120 Yds. Weigh Grains	No. of Yarn
		12		**17**		**22**		**28**	
1	1000	.3	81.30	.6	56.82	.9	43.67	.2	35.46
2	500	.4	80.65	.7	56.50	**23**	43.48	.3	35.34
3	333.3	.5	80.00	.8	56.18	.1	43.29	.4	35.21
4	250.0	.6	79.37	.9	55.87	.2	43.10	.5	35.09
5	200.0	.7	78.74	**18**	55.56	.3	42.92	.6	34.97
5.5	181.8	.8	78.12	.1	55.25	.4	42.74	.7	34.84
6	166.7	.9	77.52	.2	54.95	.5	42.55	.8	34.72
6.5	153.8	**13**	76.92	.3	54.64	.6	42.37	.9	34.60
7	142.9	.1	76.34	.4	54.35	.7	42.19	**29**	34.48
7.5	133.3	.2	75.76	.5	54.05	.8	42.02	.1	34.36
8	125.0	.3	75.19	.6	53.76	.9	41.84	.2	34.25
.1	123.5	.4	74.63	.7	53.48	**24**	41.67	.3	34.13
.2	122.0	.5	74.07	.8	53.19	.1	41.49	.4	34.01
.3	120.5	.6	73.53	.9	52.91	.2	41.32	.5	33.90
.4	119.0	.7	72.99	**19**	52.63	.3	41.15	.6	33.78
.5	117.6	.8	72.46	.1	52.36	.4	40.98	.7	33.67
.6	116.3	.9	71.94	.2	52.08	.5	40.82	.8	33.56
.7	114.9	**14**	71.43	.3	51.81	.6	40.65	.9	33.44
.8	113.6	.1	70.92	.4	51.55	.7	40.49	**30**	33.33
.9	112.4	.2	70.42	.5	51.28	.8	40.32	.1	33.22
9	111.1	.3	69.93	.6	51.02	.9	40.16	.2	33.11
.1	109.9	.4	69.41	.7	50.76	**25**	40.00	.3	33.00
.2	108.7	.5	68.97	.8	50.51	.1	39.84	.4	32.89
.3	107.5	.6	68.49	.9	50.25	.2	39.68	.5	32.79
.4	106.4	.7	68.03	**20**	50.00	.3	39.53	.6	32.68
.5	105.3	.8	67.57	.1	49.75	.4	39.37	.7	32.57
.6	104.2	.9	67.11	.2	49.50	.5	39.22	.8	32.47
.7	103.1	**15**	66.67	.3	49.26	.6	39.06	.9	32.36
.8	102.0	.1	66.23	.4	49.02	.7	38.91	**31**	32.26
.9	101.0	.2	65.79	.5	48.78	.8	38.76	.1	32.16
10	100.0	.3	65.36	.6	48.54	.9	38.61	.2	32.05
.1	99.01	.4	64.94	.7	48.31	**26**	38.46	.3	31.95
.2	98.04	.5	64.52	.8	48.08	.1	38.31	.4	31.85
.3	97.09	.6	64.10	.9	47.85	.2	38.17	.5	31.75
.4	96.15	.7	63.69	**21**	47.62	.3	38.02	.6	31.65
.5	95.24	.8	63.29	.1	47.39	.4	37.88	.7	31.55
.6	94.34	.9	62.89	.2	47.17	.5	37.74	.8	31.45
.7	93.46	**16**	62.50	.3	46.95	.6	37.59	.9	31.35
.8	92.59	.1	62.11	.4	46.73	.7	37.45	**32**	31.25
.9	91.74	.2	61.73	.5	46.51	.8	37.31	.1	31.15
11	90.91	.3	61.35	.6	46.30	.9	37.17	.2	31.06
.1	90.09	.4	60.98	.7	46.08	**27**	37.04	.3	30.96
.2	89.29	.5	60.61	.8	45.87	.1	36.90	.4	30.86
.3	88.50	.6	60.24	.9	45.66	.2	36.77	.5	30.77
.4	87.72	.7	59.88	**22**	45.45	.3	36.63	.6	30.67
.5	86.96	.8	59.52	.1	45.25	.4	36.50	.7	30.58
.6	86.21	.9	59.17	.2	45.05	.5	36.36	.8	30.46
.7	85.47	**17**	58.82	.3	44.84	.6	36.23	.9	30.40
.8	84.75	.1	58.48	.4	44.64	.7	36.10	**33**	30.30
.9	84.03	.2	58.14	.5	44.44	.8	35.97	.1	30.21
12	83.33	.3	57.80	.6	44.25	.9	35.84	.2	30.12
.1	82.64	.4	57.47	.7	44.05	**28**	35.71	.3	30.03
.2	81.97	.5	57.14	.8	43.86	.1	35.59	.4	29.94

TABLE FOR NUMBERING COTTON YARN—Cont'd.

120 Yds. Weigh Grains	No. of Yarn	120 Yds. Weigh Grains	No. of Yarn	120 Yds. Weigh Grains	No. of Yards	120 Yds. Weigh Grains	No. of Yards	120 Yds. Weigh Grains	No. of Yarn
33		**39**		**44**		**50**		**56**	
.5	29.85	.2	25.51	.9	22.27	.6	19.76	.3	17.76
.6	29.76	.3	25.45	**45**	22.22	.7	19.72	.4	17.73
.7	29.67	.4	25.38	.1	22.17	.8	19.69	.5	17.70
.8	29.59	.5	25.32	.2	22.12	.9	19.65	.6	17.67
.9	29.50	.6	25.25	.3	22.08	**51**	19.61	.7	17.64
34	29.41	.7	25.19	.4	22.03	.1	19.57	.8	17.61
.1	29.33	.8	25.13	.5	21.98	.2	19.53	.9	17.57
.2	29.24	.9	25.06	.6	21.93	.3	19.49	**57**	17.54
.3	29.15	**40**	25.00	.7	21.88	.4	19.46	.1	17.51
.4	29.07	.1	24.94	.8	21.83	.5	19.42	.2	17.48
.5	28.99	.2	24.88	.9	21.79	.6	19.38	.3	17.45
.6	28.90	.3	24.81	**46**	21.74	.7	19.34	.4	17.42
.7	28.82	.4	24.75	.1	21.69	.8	19.31	.5	17.39
.8	28.74	.5	24.69	.2	21.65	.9	19.27	.6	17.36
.9	28.65	.6	24.63	.3	21.60	**52**	19.23	.7	17.33
35	28.57	.7	24.57	.4	21.55	.1	19.19	.8	17.30
.1	28.49	.8	24.51	.5	21.51	.2	19.16	.9	17.27
.2	28.41	.9	24.45	.6	21.46	.3	19.12	**58**	17.24
.3	28.33	**41**	24.39	.7	21.41	.4	19.08	.1	17.21
.4	28.25	.1	24.33	.8	21.37	.5	19.05	.2	17.18
.5	28.17	.2	24.27	.9	21.32	.6	19.01	.3	17.15
.6	28.09	.3	24.21	**47**	21.28	.7	18.98	.4	17.12
.7	28.01	.4	24.15	.1	21.23	.8	18.94	.5	17.09
.8	27.93	.5	24.10	.2	21.19	.9	18.90	.6	17.06
.9	27.86	.6	24.04	.3	21.14	**53**	18.87	.7	17.04
36	27.78	.7	23.98	.4	21.10	.1	18.83	.8	17.01
.1	27.70	.8	23.92	.5	21.05	.2	18.80	.9	16.98
.2	27.62	.9	23.87	.6	21.01	.3	18.76	**59**	16.95
.3	27.55	**42**	23.81	.7	20.96	.4	18.73	.1	16.92
.4	27.47	.1	23.75	.8	20.92	.5	18.69	.2	16.89
.5	27.40	.2	23.70	.9	20.88	.6	18.66	.3	16.86
.6	27.32	.3	23.64	**48**	20.83	.7	18.62	.4	16.84
.7	27.25	.4	23.58	.1	20.79	.8	18.59	.5	16.81
.8	27.17	.5	23.53	.2	20.75	.9	18.55	.6	16.78
.9	27.10	.6	23.47	.3	20.70	**54**	18.52	.7	16.75
37	27.03	.7	23.42	.4	20.66	.1	18.48	.8	16.72
.1	26.95	.8	23.36	.5	20.62	.2	18.45	.9	16.69
.2	26.88	.9	23.31	.6	20.57	.3	18.42	**60**	16.67
.3	26.81	**43**	23.26	.7	20.53	.4	18.38	.1	16.64
.4	26.74	.1	23.20	.8	20.49	.5	18.35	.2	16.61
.5	26.67	.2	23.15	.9	20.45	.6	18.32	.3	16.58
.6	26.60	.3	23.09	**49**	20.41	.7	18.28	.4	16.56
.7	26.53	.4	23.04	.1	20.37	.8	18.25	.5	16.53
.8	26.46	.5	22.99	.2	20.33	.9	18.21	.6	16.50
.9	26.39	.6	22.94	.3	20.28	**55**	18.18	.7	16.47
38	26.32	.7	22.88	.4	20.24	.1	18.15	.8	16.45
.1	26.25	.8	22.83	.5	20.20	.2	18.12	.9	16.42
.2	26.18	.9	22.78	.6	20.16	.3	18.08	**61**	16.39
.3	26.11	**44**	22.73	.7	20.12	.4	18.05	.1	16.37
.4	26.04	.1	22.68	.8	20.08	.5	18.02	.2	16.34
.5	25.97	.2	22.62	.9	20.04	.6	17.99	.3	16.31
.6	25.91	.3	22.57	**50**	20.00	.7	17.95	.4	16.29
.7	25.84	.4	22.52	.1	19.96	.8	17.92	.5	16.26
.8	25.77	.5	22.47	.2	19.92	.9	17.89	.6	16.23
.9	25.71	.6	22.42	.3	19.88	**56**	17.86	.7	16.21
39	25.64	.7	22.37	.4	19.84	.1	17.83	.8	16.19
.1	25.58	.8	22.32	.5	19.80	.2	17.79	.9	16.16

TABLE FOR NUMBERING COTTON YARN—Cont'd.

120 Yds. Weigh Grains	No. of Yarn	120 Yds. Weigh Grains	No. of Yarn	120 Yds. Weigh Grains	No. of Yarn	120 Yds. Weigh Grains	No. of Yarn	120 Yds. Weigh Grains	No. of Yarn
62	16.13	**67** .7	14.77	**73** .4	13.62	**79** .1	12.64	**84** .8	11.79
.1	16.10	.8	14.75	.5	13.61	.2	12.63	.9	11.78
.2	16.08	.9	14.73	.6	13.59	.3	12.61	**85**	11.76
.3	16.05	**68**	14.71	.7	13.57	.4	12.59	.1	11.75
.4	16.03	.1	14.68	.8	13.55	.5	12.58	.2	11.74
.5	16.00	.2	14.66	.9	13.53	.6	12.56	.3	11.72
.6	15.97	.3	14.64	**74**	13.51	.7	12.55	.4	11.71
.7	15.95	.4	14.62	.1	13.50	.8	12.53	.5	11.70
.8	15.92	.5	14.60	.2	13.48	.9	12.52	.6	11.68
.9	15.90	.6	14.58	.3	13.46	**80**	12.50	.7	11.67
63	15.87	.7	14.56	.4	13.44	.1	12.48	.8	11.66
.1	15.85	.8	14.53	.5	13.42	.2	12.47	.9	11.64
.2	15.83	.9	14.51	.6	13.40	.3	12.45	**86**	11.63
.3	15.80	**69**	14.49	.7	13.39	.4	12.44	.1	11.61
.4	15.77	.1	14.47	.8	13.37	.5	12.42	.2	11.60
.5	15.75	.2	14.45	.9	13.35	.6	12.41	.3	11.59
.6	15.72	.3	14.43	**75**	13.33	.7	12.39	.4	11.57
.7	15.70	.4	14.41	.1	13.32	.8	12.38	.5	11.56
.8	15.67	.5	14.39	.2	13.30	.9	12.36	.6	11.55
.9	15.65	.6	14.37	.3	13.28	**81**	12.35	.7	11.53
64	15.62	.7	14.35	.4	13.26	.1	12.33	.8	11.52
.1	15.60	.8	14.33	.5	13.25	.2	12.32	.9	11.51
.2	15.58	.9	14.31	.6	13.23	.3	12.30	**87**	11.49
.3	15.55	**70**	14.29	.7	13.21	.4	12.29	.1	11.48
.4	15.53	.1	14.27	.8	13.19	.5	12.27	.2	11.47
.5	15.50	.2	14.25	.9	13.18	.6	12.25	.3	11.45
.6	15.48	.3	14.22	**76**	13.16	.7	12.24	.4	11.44
.7	15.46	.4	14.20	.1	13.14	.8	12.22	.5	11.43
.8	15.43	.5	14.18	.2	13.12	.9	12.21	.6	11.42
.9	15.41	.6	14.16	.3	13.11	**82**	12.20	.7	11.40
65	15.38	.7	14.14	.4	13.09	.1	12.18	.8	11.39
.1	15.36	.8	14.12	.5	13.07	.2	12.17	.9	11.38
.2	15.34	.9	14.10	.6	13.05	.3	12.15	**88**	11.36
.3	15.31	**71**	14.08	.7	13.04	.4	12.14	.1	11.35
.4	15.29	.1	14.06	.8	13.02	.5	12.12	.2	11.34
.5	15.27	.2	14.04	.9	13.00	.6	12.11	.3	11.33
.6	15.24	.3	14.03	**77**	12.99	.7	12.09	.4	11.31
.7	15.22	.4	14.01	.1	12.97	.8	12.08	.5	11.30
.8	15.20	.5	13.99	.2	12.95	.9	12.06	.6	11.29
.9	15.17	.6	13.97	.3	12.94	**83**	12.05	.7	11.27
66	15.15	.7	13.95	.4	12.92	.1	12.03	.8	11.26
.1	15.13	.8	13.93	.5	12.90	.2	12.02	.9	11.25
.2	15.11	.9	13.91	.6	12.89	.3	12.00	**89**	11.24
.3	15.08	**72**	13.89	.7	12.87	.4	11.99	.1	11.22
.4	15.06	.1	13.87	.8	12.85	.5	11.98	.2	11.21
.5	15.04	.2	13.85	.9	12.84	.6	11.96	.3	11.20
.6	15.02	.3	13.83	**78**	12.82	.7	11.95	.4	11.19
.7	14.99	.4	13.81	.1	12.80	.8	11.93	.5	11.17
.8	14.97	.5	13.79	.2	12.79	.9	11.92	.6	11.16
.9	14.95	.6	13.77	.3	12.77	**84**	11.90	.7	11.15
67	14.93	.7	13.76	.4	12.76	.1	11.89	.8	11.14
.1	14.90	.8	13.74	.5	12.74	.2	11.88	.9	11.12
.2	14.88	.9	13.72	.6	12.72	.3	11.86	**90**	11.11
.3	14.86	**73**	13.70	.7	12.71	.4	11.85	.1	11.10
.4	14.84	.1	13.68	.8	12.69	.5	11.83	.2	11.09
.5	14.81	.2	13.66	.9	12.67	.6	11.82	.3	11.07
.6	14.79	.3	13.64	**79**	12.66	.7	11.81	.4	11.06

TABLE FOR NUMBERING COTTON YARN—Cont'd.

120 Yds. Weigh Grains	No. of Yarn	120 Yds. Weigh Grains	No. of Yarn	120 Yds. Weigh Grains	No. of Yarn	120 Yds. Weigh Grains	No. of Yarn	120 Yds. Weigh Grains	No. of Yarn
90		**96**		**101**		**107**		**117**	
.5	11.05	.2	10.40	.9	9.81	.6	9.29	.6	8.50
.6	11.04	.3	10.38	**102**	9.80	.7	9.29	.8	8.49
.7	11.03	.4	10.37	.1	9.79	.8	9.28	**118**	8.47
.8	11.01	.5	10.36	.2	9.78	.9	9.27	.2	8.46
.9	11.00	.6	10.35	.3	9.78	**108**	9.26	.4	8.45
91	10.99	.7	10.34	.4	9.77	.1	9.25	.6	8.43
.1	10.98	.8	10.33	.5	9.76	.2	9.24	.8	8.42
.2	10.96	.9	10.32	.6	9.75	.3	9.23	**119**	8.40
.3	10.95	**97**	10.31	.7	9.74	.4	9.23	.2	8.39
.4	10.94	.1	10.30	.8	9.73	.5	9.22	.4	8.38
.5	10.93	.2	10.29	.9	9.72	.6	9.21	.6	8.36
.6	10.92	.3	10.28	**103**	9.71	.7	9.20	.8	8.35
.7	10.91	.4	10.27	.1	9.70	.8	9.19	120	8.33
.8	10.89	.5	10.26	.2	9.69	.9	9.18	.2	8.32
.9	10.88	.6	10.25	.3	9.68	**109**	9.17	.4	8.31
92	10.87	.7	10.24	.4	9.67	.2	9.16	.6	8.29
.1	10.86	.8	10.22	.5	9.66	.4	9.14	.8	8.28
.2	10.85	.9	10.21	.6	9.65	.6	9.12	**121**	8.26
.3	10.83	**98**	10.20	.7	9.64	.8	9.11	.4	8.24
.4	10.82	.1	10.19	.8	9.63	110	9.09	.6	8.22
.5	10.81	.2	10.18	.9	9.62	.2	9.07	.8	8.21
.6	10.80	.3	10.17	**104**	9.62	.4	9.06	122	8.20
.7	10.79	.4	10.16	.1	9.61	.6	9.04	.5	8.16
.8	10.78	.5	10.15	.2	9.60	.8	9.03	123	8.13
.9	10.76	.6	10.14	.3	9.59	**111**	9.01	.5	8.10
93	10.75	.7	10.13	.4	9.58	.2	8.99	124	8.06
.1	10.74	.8	10.12	.5	9.57	.4	8.98	.5	8.03
.2	10.73	.9	10.11	.6	9.56	.6	8.96	**125**	8.00
.3	10.72	**99**	10.10	.7	9.55	.8	8.94	.5	7.97
.4	10.71	.1	10.09	.8	9.54	112	8.93	126	7.94
.5	10.70	.2	10.08	.9	9.53	.2	8.91	.5	7.91
.6	10.68	.3	10.07	**105**	9.52	.4	8.90	127	7.87
.7	10.67	.4	10.06	.1	9.51	.6	8.88	.5	7.84
.8	10.66	.5	10.05	.2	9.51	.8	8.87	128	7.81
.9	10.65	.6	10.04	.3	9.50	**113**	8.85	.5	7.78
94	10.64	.7	10.03	.4	9.49	.2	8.83	129	7.75
.1	10.63	.8	10.02	.5	9.48	.4	8.82	.5	7.72
.2	10.62	.9	10.01	.6	9.47	.6	8.80	**130**	7.69
.3	10.60	**100**	10.00	.7	9.46	.8	8.79	.5	7.66
.4	10.59	.1	9.99	.8	9.45	114	8.77	131	7.63
.5	10.58	.2	9.98	.9	9.44	.2	8.76	.5	7.60
.6	10.57	.3	9.97	**106**	9.43	.4	8.74	132	7.58
.7	10.56	.4	9.96	.1	9.43	.6	8.73	.5	7.55
.8	10.55	.5	9.95	.2	9.42	.8	8.71	133	7.52
.9	10.54	.6	9.94	.3	9.41	**115**	8.70	.5	7.49
95	10.53	.7	9.93	.4	9.40	.2	8.68	134	7.46
.1	10.52	.8	9.92	.5	9.39	.4	8.67	.5	7.43
.2	10.50	.9	9.91	.6	9.38	.6	8.65	**135**	7.41
.3	10.49	**101**	9.90	.7	9.37	.8	8.64	.5	7.38
.4	10.48	.1	9.89	.8	9.36	116	8.62	136	7.35
.5	10.47	.2	9.88	.9	9.35	.2	8.61	.5	7.33
.6	10.46	.3	9.87	**107**	9.35	.4	8.59	137	7.30
.7	10.45	.4	9.86	.1	9.34	.6	8.58	.5	7.27
.8	10.44	.5	9.85	.2	9.33	.8	8.56	138	7.25
.9	10.43	.6	9.84	.3	9.32	**117**	8.55	.5	7.22
96	10.42	.7	9.83	.4	9.31	.2	8.53	139	7.19
.1	10.41	.8	9.82	.5	9.30	.4	8.52	.5	7.17

TABLE FOR NUMBERING COTTON YARN—Cont'd.

120 Yds. Weigh Grains	No. of Yarn	120 Yds. Weigh Grains	No. of Yarn	120 Yds. Weigh Grains	No. of Yarn	120 Yds. Weigh Grains	No. of Yarn	120 Yds. Weigh Grains	No. of Yarn
140	7.14	168	5.95	222	4.50	306	3.27	470	2.13
.5	7.12	.5	5.93	223	4.48	308	3.25	475	2.11
141	7.09	169	5.92	224	4.46	**310**	3.23	480	2.08
.5	7.07	.5	5.90	225	4.44	312	3.21	485	2.06
142	7.04	**170**	5.88	226	4.42	314	3.18	490	2.04
.5	7.02	171	5.85	227	4.41	316	3.17	495	2.02
143	6.99	172	5.81	228	4.39	318	3.14	**500**	2.00
.5	6.97	173	5.78	229	4.37	320	3.12	505	1.98
144	6.94	174	5.75	**230**	4.35	322	3.11	510	1.96
.5	6.92	175	5.71	231	4.33	324	3.09	515	1.94
145	6.90	176	5.68	232	4.31	326	3.07	520	1.92
.5	6.87	177	5.65	233	4.29	328	3.05	525	1 90
146	6.85	178	5.62	234	4.27	**330**	3.03	530	1.89
.5	6.83	179	5.59	235	4.26	332	3.01	535	1.87
147	6.80	**180**	5 56	236	4.24	334	2.99	540	1.85
.5	6.78	181	5.52	237	4.22	336	2.98	545	1.83
148	6.76	182	5.49	238	4.20	338	2.96	**550**	1.82
.5	6.73	183	5.46	239	4.18	340	2.94	555	1.80
149	6.71	184	5.43	**240**	4.17	342	2.92	560	1.79
.5	6.69	185	5.41	241	4.15	344	2.91	565	1.77
150	6.67	186	5.38	242	4.13	346	2.89	570	1.75
.5	6.64	187	5.35	243	4.12	348	2.87	575	1.74
151	6.62	188	5.32	244	4.10	**350**	2.86	580	1.72
.5	6.60	189	5.29	245	4.08	352	2.84	585	1.71
152	6.58	**190**	5.26	246	4.07	354	2.82	590	1.69
.5	6.56	191	5.24	247	4.05	356	2.81	595	1.68
153	6.54	192	5.21	248	4.03	358	2.79	**600**	1.67
.5	6.51	193	5.18	249	4.02	360	2.78	610	1.64
154	6.49	194	5.15	**250**	4.00	362	2.76	620	1.61
.5	6.47	195	5.13	252	3.97	364	2.75	630	1.59
155	6.45	196	5.10	254	3.94	366	2.73	640	1 56
.5	6.43	197	5.08	256	3.91	368	2.72	650	1.54
156	6.41	198	5.05	258	3.88	**370**	2.70	660	1.52
.5	6.39	199	5.03	260	3.85	372	2.69	670	1.49
157	6.37	**200**	5.00	262	3.82	374	2.67	680	1.47
.5	6.35	201	4.98	264	3.79	376	2.66	690	1.45
158	6.33	202	4.95	266	3.76	378	2.65	**700**	1.43
.5	6.31	203	4.93	268	3.73	380	2.63	710	1.41
159	6.29	204	4.90	**270**	3.70	382	2.62	720	1.39
.5	6.27	205	4.88	272	3.68	385	2.60	730	1.37
160	6.25	206	4.85	274	3.65	390	2.56	740	1.35
.5	6.23	207	4.83	276	3.62	395	2.53	750	1.33
161	6.21	208	4.81	278	3.60	**400**	2.50	760	1.32
.5	6.19	209	4.78	280	3.57	405	2.47	770	1.30
162	6.17	**210**	4.76	282	3.55	410	2.44	780	1.28
.5	6.15	211	4.74	284	3.52	415	2.41	790	1.27
163	6.13	212	4.72	286	3.50	420	2.38	**800**	1.25
.5	6.12	213	4.69	288	3.47	425	2.35	820	1.22
164	6.10	214	4.67	**290**	3.45	430	2.33	840	1.19
.5	6.08	215	4.65	292	3.42	435	2.30	860	1.16
165	6.06	216	4.63	294	3.40	440	2.27	880	1.14
.5	6.04	217	4.61	296	3.38	445	2.25	900	1.11
166	6.02	218	4.59	298	3.36	**450**	2.22	925	1.08
.5	6.01	219	4.57	300	3 33	455	2.20	950	1.05
167	5.99	**220**	4.55	302	3.31	460	2.17	975	1.03
.5	5.97	221	4.52	304	3.29	465	2.15	1000	1.00

DRAPER TABLES OF BREAKING WEIGHTS OF AMERICAN YARNS SPUN FROM AMERICAN COTTON.

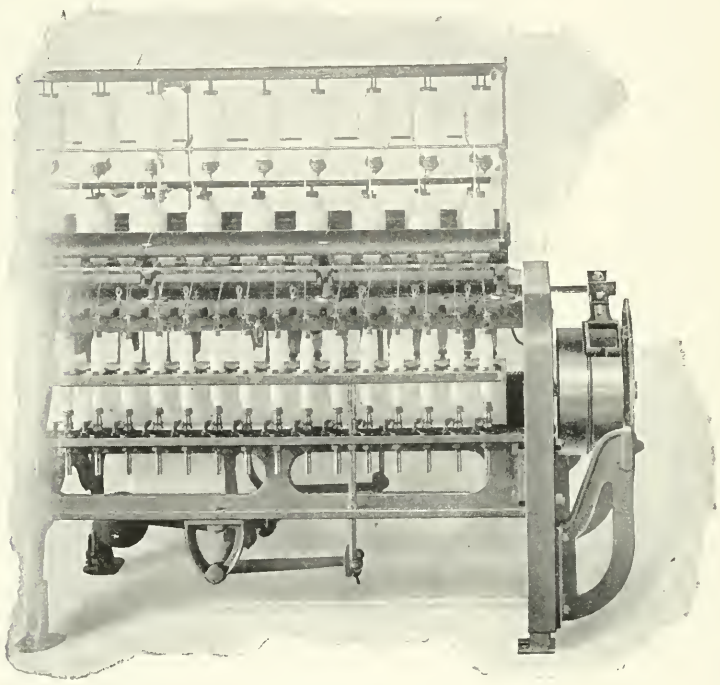
AVERAGED FROM SAMPLE SKEIN TESTS FROM SEVERAL HUNDRED AMERICAN MILLS.

Weight in Grains of 120 Yards	No. of Yarn	Breaking Weight of Warp Yarn		Breaking Weight of		Weight in Grains of 120 Yards	No. of Yarn	Breaking Weight of	
		OLD	NEW	Combed Warp NEW	Soft Twist Yarn NEW			Warp Yarn OLD	Combed Warp NEW
1000	1					19.6	51	36.6	47—
500	2					19.2	52	36.1	46
333.3	3	530	634+	863—	620+	18.9	53	35.5	45+
250	4	410	476—	646	462	18.5	54	34.9	44+
200	5	330	381	516	367	18.2	55	34.4	43+
166.7	6	275	318—	429+	304—	17.9	56	33.8	42+
142.9	7	237.6	272+	367+	258+	17.5	57	33.4	42—
125	8	209	238+	321	224+	17.2	58	32.8	41—
111.1	9	186.5	212+	285—	198+	17	59	32.3	40+
100	**10**	168.7	191	256	177	16.7	**60**	31.7	39+
90.9	11	154.1	174—	232+	160—	16.4	61	31.3	39—
83.3	12	142	159+	213—	145+	16.1	62	30.8	38—
76.9	13	131.5	147+	196	133+	15.9	63	30.4	37+
71.4	14	122.8	137—	182—	123—	15.6	64	30	37—
66.7	15	115.1	128—	169+	114—	15.4	65	29.6	36
62.5	16	108.4	121—	158+	106—	15.2	66	29.2	35+
58.8	17	102.5	113—	149—	99—	14.9	67	28.8	35—
55.6	18	97.3	107—	140+	93—	14.7	68	28.5	34+
52.6	19	92.6	101	133—	87	14.5	69	28.2	34—
50	**20**	88.3	96	126	82	14.3	**70**	27.8	33+
47.6	21	83.8	91+	120—	77+	14.1	71	27.4	33—
45.5	22	79.7	87+	114+	73+	13.9	72	27.1	32+
43.5	23	75.9	84—	109+	70—	13.7	73	26.8	32—
41.7	24	72.4	80+	104+	66+	13.5	74	26.5	31+
40	25	69.2	77	100	63	13.3	75	26.2	31—
38.5	26	66.3	74+	96	60+	13.2	76	25.8	30+
37	27	63.6	71+	92+	57+	13	77	25.5	30—
35.7	28	61.3	69—	89—	55—	12.8	78	25.3	29+
34.5	29	59.2	67—	86—	53—	12.7	79	24.9	29—
33.3	**30**	57.3	64+	83—	50+	12.5	**80**	24.6	28+
32.3	31	55.6	62+	80	48+	12.4	81	24.3	28+
31.3	32	54	60+	77+	46+	12.2	82	24	28—
30.3	33	52.6	59—	75—	45—	12.1	83	23.7	27+
29.4	34	51.2	57—	72+	43—	11.9	84	23.4	27—
28.6	35	50	55+	70+	41+	11.8	85	23.2	27—
27.8	36	48.7	54—	68+	40—	11.6	86	22.8	26+
27	37	47.6	52+	66+	38+	11.5	87	22.6	26—
26.3	38	46.5	51	64+	37	11.4	88	22.4	26—
25.6	39	45.5	50—	63—	36—	11.2	89	22.2	25+
25	**40**	44.6	48+	61	34+	11.1	**90**	22	25—
24.4	41	43.8	47+	59+	33+	11	91	21.7	25—
23.8	42	43	46+	58—	32+	10.9	92	21.5	24+
23.3	43	42.2	45+	56+	31+	10.8	93	21.3	24—
22.7	44	41.4	44+	55+	30+	10.6	94	21.2	24—
22.2	45	40.7	43+	54—	29+	10.5	95	21	23+
21.7	46	40	42+	53—	28+	10.4	96	20.7	23+
21.3	47	39.3	41+	51+	27+	10.3	97	20.5	23—
20.8	48	38.6	41—	50+	27—	10.2	98	20.4	23—
20.4	49	37.9	40—	49+	26—	10.1	99	20.2	22+
20	**50**	37.3	39	48	25	10	**100**	20	22

TRAVELLER TABLE FOR RING SPINNING FRAME.

No. of Yarn	Warp Yarn				Filling Yarn			
	Revs. of Spindles	Dia. of Ring	No. of Traveller	Weight of 10 Travellers in Grains	Revs. of Spindles	Dia. of Ring	No. of Traveller	Weight of 10 Travellers in Grains
4	4950	2¼	14	39	4000		16	44
6	5900		12	33	4800		13	36
8	6650		9	23	5450		10	26
10	7250		8	20	5950		8	20
11	7500		7	18	6150		7	18
12	7750	2⅛	6	16	6350		6	16
13	7950		6	16	6500		5	14
14	8150		5	14	6700	1½	4	13
15	8300		4	13	6850	to	3	12
16	8450		3	12	6950	1⅝	2	11
17	8600		2	11	7100		1	10
18	8750		1	10	7200		1-0	9
19	8850		1-0	9	7300		3-0	8
20	8950	2	2-0	8½	7400		5-0	7
21	9050		3-0	8	7500		5-0	7
22	9100		4-0	7½	7600		6-0	6½
23	9150		5-0	7	7700		6-0	6½
24	9200		6-0	6½	7800		7-0	6
28	9500	1¾	7-0	6	7900		8-0	5½
32	9500		8-0	5½	7900		9-0	5
34	9600		9-0	5	7900	1⅜	10-0	4½
36	9700	1⅝	10-0	4½	7900		11-0	4
38	9800		11-0	4	7900		12-0	3¾
40	9700		12-0	3¾	7900		13-0	3½
45	9700		13-0	3½	7900		14-0	3¼
50	9700		14-0	3¼	7900		15-0	3
55	9600	1½	14-0	3¼	7900		15-0	3
60	9600		15-0	3	7900		16-0	2¾
65	9600		15-0	3	7800		16-0	2¾
70	9600		16-0	2¾	7800	1¼	17-0	2½
75	9500		16-0	2¾	7800		17-0	2½
80	9500		17-0	2½	7700		18-0	2¼
85	9100	1⅜	17-0	2½	7600		18-0	2¼
90	9100		18-0	2¼	7400		19-0	2
95	9000		19-0	2	7400		20-0	1¾
100	8700		20-0	1¾	7200		21-0	1½
110	8500		21-0	1½	6900		22-0	1¼

The speed, kind of cotton, etc., affect the weight of traveller, and consequently it is impossible to make up a table to cover all conditions, but the sizes given above will serve as a basis to select from. Lighter travellers should be used for higher speeds and vice versa. Each 1,000 revolutions of spindle makes a difference of one or two numbers in travellers.



FOOT END SECTION

MODEL "A" SPINNING FRAME, BELT DRIVE